October 1957

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THE NAVAL AVIATION SAFETY REVIEW




page 4

1957 CNO SAFETY AWARD WINNERS

# IN THIS ISSUE

Vol. 3 No. 4 October 1957



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ON THE COVER . . . the coveted 1957 CNO Aviation Safety Award. With a commendation and a challenge, VCNO leads off the report on this, the third year of a fleet-wide competition for the annual awards—page 3.


# Letters to

*Approach welcomes letters from its readers. Send yours either via official channels or direct on Anymouse forms. All letters should be signed. However, names will be withheld on request.*

*Address: Approach Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va.*

## WANTS PILOT QUALITY CONTROL

Sir:

Congratulations on your excellent and timely article "Unknown Quantity" in the July issue. As a flight surgeon, I am gratified to read a frank and constructive discussion of a field about which little has been written.

. . . Your idea of a file card system is a step in the right direction, and I offer a suggestion which goes one step further. Let each squadron set up a Safety of Flight Board, with the members to consist of the Exec, Safety Officer, Ops Officer, Nav Officer, Training Officer and Flight Surgeon. *Periodically*, the board could review the log books, file cards and other pertinent data

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of each pilot in the squadron. Division and section leaders, the LSO, and others would be available to the board for their comments. In the case of adverse findings, the board would then refer the matter to the squadron skipper.

. . . It is emphasized that any such board would act in an advisory capacity to the squadron Commanding Officer and would aid in providing "the best in quality control" of his pilots. If aviation safety is to continue to be primarily preventive in nature, this quality control is an essential element.

FLIGHT SURGEON

## DITTO

Sir:

Please take a bow for your July article "Unknown Quantity." Being the squadron safety officer mentioned therein, I can state with some authority that you've given a precise presentation of the advantages and possible pitfalls of the individual pilot safety card system. Much more important however, is the fact that the brilliantly informal discussion type article will set a lot of squadron skippers and safety officers to thinking about the problem and the card system.

Any system which will serve to detect unsafe trends, techniques or habit patterns is better than no system at all. If the safety officer is going to fulfill his primary mission—prevention of accidents—his system must provide for detection of the individual pilot's problems. Without a written record this is impossible.

FLIGHT SAFETY OFFICER

*Thanks! Any others have comments?—Ed.*

## CALLING ALL HANDS

Sir:

Not too long ago we learned of a mid-air collision involving two aircraft at the high station. Since that happened to a sister outfit it got us "all shook up." We took a look around and decided it *could* happen here. These are the conditions as they exist here. Could they be the same other places?

1. Pilots in order to become proficient in instrument flying must fly instruments. (True?)

2. While flying instruments it is difficult to keep a good VFR lookout. (If you have a chase pilot or dual pilot they are pretty busy flying wing, checking instruments and trying to lookout, too.)

3. The gray paint on most service aircraft makes them, at best, hard to see, and almost invisible in the usual summer haze that plagues our jet bases. (True, the haze only goes up about 10,000 feet usually, but it is below this level that half of the penetration is made.)

4. Some pilots do not call for approach clearance until they are at or very near the high station, others never do call.

5. When the pilot calls, the approach controllers do not always tell the pilot of other reported traffic.

Many articles have been written about mid-air collisions, lookout doctrine and the pilot's responsibilities. For those who have made practice penetrations there is no need to digress on the difficulty of making a decent penetration and keeping a good lookout. But a pilot VFR is fully responsible for maintaining separation. We acknowledge and accept this responsibility but feel it is a job that requires the cooperation of all hands.

Here is what we have our pilots do:

1. Call and request permission to use a radio facility from the controlling agency before using it. If only making a penetration, call several minutes out with station estimate and request clearance.

2. As soon as practicable, set up a listening watch on the facility frequency so as to intercept any calls made by other aircraft to the controlling agency.

3. Avoid flying at the penetration altitude especially in the vicinity of radio facilities.

4. Adhere as closely as possible to letdown procedures. Avoid especially a stair-step type penetration to preclude letting down on top of, or pulling up into, another aircraft in a similiar penetration.

5. In addition, if the approach controllers don't volunteer information of any other known traffic (VFR or otherwise) we ask them for it.

We feel it would be a lot easier for all hands if everyone would follow these procedures.

FSO, FAWTULant Det. B

*Excellent!—Ed.*

## WHY?

Sir:

Why can't we have all the radio aids on the letdown plates instead of just those required for the particular letdown?

Example: Patuxent River radio range sheet does not show the homer or fan marker just short of runway 06 (I know it's easy to look up the other sheets but . . .)

J. K. PUMPLE,
Lt., RCN

*The best answer is that the approach plates would get a little cluttered. You probably know by now that in the new low-altitude approach plates, which replaced the H.O. 510 series, you have only to flip over the Pax River range procedure and there is the ILS procedure with the homer (beacon) and fan marker clearly shown.*

*In this case they are combined into a "compass locater, middle marker" and unless you have dual ADF's it might be disturbing to crank in the homer frequency after passing the range station on final approach. Of course there is no added trouble to use the fan marker as a distance indicator from the field boundary.—Ed.*

## WHOSE PETARD?

Sir:

Page 8 of June issue shows a pilot wearing a hardhat while getting briefed on weather . . . It seems to me that fledgling birdmen are taught at Pensacola to wear the hardhat only while actually seated in the cockpit. The purpose of this, I believe, is to keep from marching into a prop or jet blast due to not having heard a warning shout.

J. F. CHESLEY,
Lt. (JG)

*Good point, for walking on the ramp—but the hardhat, like a billiard ball, wants to keep rolling when you set it down. Unlike a billiard ball, it gets damaged. So we figure it's often wise to park it on the hat rack it was made for. Ever tried to replace a broken helmet part before your clearance expires?—Ed.*

## SEARCH AID

Sir:

Two accidents within a week aboard this ship have cost two pilots and aircraft . . . In both cases the exact point of origin of a search could not be determined . . .

Could not dye marker be put in water soluble bags and mounted somewhere within the airframe so that they would mark the exact crash site in cases where an incapacitated pilot was unable to release dye. Once a search found

Continued next page

# Letters to the Editor Continued

this dye the search area could immediately be reduced.

R. B. WHITEGIVER
Lt., VA Sqdn

*The idea sounds worthwhile and has been passed on to the aeromedical department and to BuAer where similar devices are being worked on.—Ed.*

### PROFESSIONAL APPROACH

Sir:
VF-112 received the [ComNavAirPac] Safety Award for 1st Quarter 1957 and we're justifiably proud . . . Squadron had 2 senior pilots (XO and Ops Officer), who had no previous jet time except JTTU, and 13 pilots fresh out of the training command who had no swept-wing jet time. . . . A change from the F9F-8B to the F3H-2M two months after the training cycle began combined problems of checking out 15 pilots in two models of aircraft, 6 pilots in one model and two transitions from props to jets.

. . . During lectures and maintenance discussions . . . we received recommendations for procedure changes from anyone who thought he had a better idea. . . This squadron believes in the old saying "From the mouths of babes. . . . ."

. . . Our program for recognizing deserving line personnel: Weekly inspections are made of all squadron aircraft, the plane captain and his two assistants are quizzed thoroughly on procedures . . . aircraft are graded for cleanliness and conformance to ADMAT and preflight X-off list requirements, and each plane captain receives a grade. To this grade is added or subtracted any extra marks he might receive for being "heads up" on the line, or for a goof he pulls (leaves the wheel pins in, etc.)

At the end of each month the plane-captain-of-the-month is given a model of the F3H donated by McDonnell Aircraft Corporation.

This program has had excellent response since it was initiated, and has resulted in alert action on the part of the plane captains.

Z. J. KOWALSKEY, JR., LTJG

### IFR?

Sir:
The term "IFR" is ambiguous and has led to many heated arguments around our operations department "cracker barrel."

Can you interpret for us?

LT, NAS, Akron

*The ANC Manual definition for Instrument Flight Rules conditions reads, "Weather conditions below the minimum prescribed for flight under Visual Flight Rules (VFR)."*

*Civil Air Regulations part 60 are pretty specific about the necessity of obtaining an air traffic clearance when you can't maintain VFR minimums. So when an air traffic clearance must be obtained you are under Instrument Flight Rules or IFR.*

*There is an exception, in the ANC manual (procedures for the control of air traffic, part 3.8 entitled special VFR operations within a control zone). However, an air traffic clearance and standard IFR separation is required even then.*

*The ANC manual mentioned above, CAR part 60, and the Supplementary Flight Information Document should be able to settle most of your "cracker barrel" discussions.—Ed.*

### HELP WANTED

Sir:
Concerning your VAH accident discussion in the June 1957 issue of *Approach* (inexperienced A3D) pilot on 2nd solo ran off 6000 foot runway), I would like to make the following observations:

1. I don't believe that the Air Force Strategic Air Command would ever allow one of their valuable B-47's to conduct training operations on six to seven thousand five hundred foot runways.

2. Perhaps the Navy does not have facilities or funds comparable to those of SAC, but still is it necessary for us to operate aircraft like the A3D from such short, inadequate runways?

3. Having an experienced A3D pilot fly with newly qualified pilots on their early solo flights will help prevent this type accident; but adequate runways eight to ten thousand feet in length will help more.

DON HAYNSWORTH
JTTU NAS Olathe

*Very interesting — particularly No. 3 re an experienced pilot aboard. Any other comments, men? —Ed.*

### COUNT ME IN!

Sir:
I am enclosing $2.50 for a year's subscription to *Approach* magazine. Please send my copies to James F. Woodhull, AD2, ATU Check Crew, NAS Memphis, Tenn.

*Thanks. Your money order cashed and forwarded to Superintendent of Documents, Government Printing Office, Washington 25, D. C., who handles all personal subscriptions to Approach. Others wanting a personal copy regularly are requested to do likewise, rather than forward money to NASC. Readers may be interested in knowing that military personnel are the largest single group buying personal subscriptions to this magazine.—Ed.*

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**M**Y HEARTY congratulations go to the squadrons and ships whose outstanding safety records won for them 1957 Aviation Safety Awards. To all who were instrumental in reducing the Fiscal 1957 aircraft major accident rate to a new low of 3.06 accidents per 10,000 flight hours, I extend a sincere "well done." Improved safety records yield, without doubt, increased readiness and effectiveness in the fleet. When these records are achieved in a year such as 1957, during which time our stable of top performance carrier jet aircraft increased fivefold, the gain in striking power is indeed significant.

It is axiomatic that increasing safety cannot be achieved along with increasing capabilities in the air without the proper emphasis on education and supervision. And this emphasis can only result from adequate command responsibility toward the broad aspects of aviation safety. Therefore, to the commanding officers of those winning units I extend my special compliments.

The extended reach and added punch of our "air arm" have not been attained without handicap. In spite of the safest year to date, 1957 aviation accident costs continued to climb. This increase was in direct proportion to the increased complexity in both maintenance and operation of high performance aircraft. It is not enough for us to understand the source of our mounting costs, we must continually place more emphasis on all positive and professional approaches to safety. Although there seems to be no limit placed on the performance capabilities of our future aircraft, we must recognize that there is a limit to the cost we can afford in producing and operating those aircraft.

Aviation safety has become far more than a campaign for safe practices and the elimination of hazardous situations. In fact, the latter goal becomes increasingly difficult in any hard-hitting outfit. Aviation safety is a complex and highly specialized program, the objective of which is to render each new increment in aircraft performance not only operationally effective but also economically feasible.


H. D. Felt

H. D. FELT
Vice Chief of Naval Operations


# THE WINNERS!

**25** squadrons and

**4** carriers

**share honors in winning the CNO**

**Safety Awards for fiscal 1957.**

HOW DID these units win a safety award?

It could have been mere luck, but it wasn't. Past statistics prove that. A good safety record is positive *evidence* of a professional attitude toward safety.

But before reviewing their story let us find out how the winners were selected?

The winners were nominated by their respective major commands: ComNavAirLant, ComNavAirPac, CNAResTra, CNAVanTra and CNABaTra. The all-Navy/Marine Corps winners were nominated by ComNavAirLant and ComNavAirPac. Nominations were forwarded to CNO via the Naval Aviation Safety Center, where the nominees' accident statistics were verified. Provision for the CNO program are outlined in OpNav Instr. 3590.5.

The establishment of criteria for determining relative safety standing among commands which operate varied types of aircraft involves many considerations.

Allowance must be made for the periods of carrier-based operation when the accident potential is greater. Some squadrons converted to new aircraft during the fiscal year. A handicap factor, based on the accident rate for each type aircraft for the first nine months of the fiscal year was used to adjust for this.

The factors causing an accident must be applied too; fatigue or strain in a pilot is more easily detectible than fatigue in a hidden bolt, so the point penalty for personnel-induced accidents is greater than for those involving material failure. And of course the utilization of aircraft must be taken into account—for the safest squadron is indeed the one which doesn't fly at all!

To those who "almost won," a word of encouragement for the current fiscal year: You don't *lose* just because you didn't win—not in safety. If your effort has saved *one* person's life, or *one* airplane, you have made a real contribution to safety and the combat effectiveness of our fleet. Keep at it!

## ALL NAVY AND MARINE CORPS

CO—CDR J. F. Dorrington

### VAH/VQ HEAVY ATTACK SQADRON ONE, A3D-1 (Atlantic)

Operating with a new model aircraft under accelerated circumstances, VAH-1 first conducted pilot familiarization training and then carrier qualification. This required many hours of continuous round-the-clock work by maintenance and other departments. It also necessitated a most careful inspection of the aircraft by pilot and crew in order to insure the utmost in safety. In addition to shorter deployments, the squadron was carrier-based in the Mediterranean for six months.

LSO & Safety Officer—LCDR B. C. Hamilton

CO—CDR N. S. Weary

### VS ANTI-SUBMARINE SQUADRON 37; S2F-1, -2 (Pacific)

The commanding officer insisted that each pilot be a competent professional aviator; professional results were required and anything less was unacceptable. He insisted that each pilot be a safety officer continually at work for not just safety, but all-around heads-up operations. The maintenance officer was instrumental in establishing the squadron's aviation safety and accident prevention program, stressing the importance of sound maintenance practices to flight safety.

Maintenance Officer—LCDR W. C. Madsen

CO—LCOL J. W. Zuber

### HMR MARINE HELICOPTER TRANSPORT SQUADRON (LIGHT) 361; HRS-1, -2, 3 (Atlantic)

Through extensive safety lectures and discussions, and engineering lectures on the capabilities and limitations of assigned aircraft, this squadron has schooled its pilots in safe and efficient flying procedures. Pilots joining the squadron are trained according to specified standard procedures and newly designated naval aviators are given the "double treatment" both in the air and on the ground. High morale, air discipline, proper supervision and team operation in the squadron made safety a routine accomplishment.

Operations Officer—MAJ O. W. Curtiss

CO—CDR M. A. Graham

## HS/HU HELICOPTER ANTI-SUBMARINE SQUADRON SEVEN, HO4S-3/SNB-5 (Atlantic)

Highlights of the squadron's safety program included weekly lectures by the safety officer in which he reviewed helicopter accident reports and discussed helicopter shipboard operations, standard operating procedures and aircraft accident investigation. Noteworthy is the rapidity and thoroughness with which a handful of helicopter mechanics trained other squadron personnel upon the squadron's commissioning in April 1956. The squadron also participated in the development of the new helicopter rescue net.

Safety Officer—LCDR W. A. Christensen

CO—CAPT O. A. Finley

## VW AIRBORNE EARLY WARNING SQUADRON 13; WV-2/R7V (Atlantic)

The thorough and extensive pre-deployment training of pilots, flight engineers, navigators and technical ratings was the main factor contributing to the squadron's safety achievement even under the most adverse weather conditions. The safety attitude of the maintenance officer and supervisors created harmonious relationships between the maintenance and flight crews and contributed to the safe aircraft performance. Proper attitude plus technical knowledge plus experienced supervisors equaled the squadron's safety achievement.

Safety Officer—CDR. T. M. Campbell

CO—CAPT R. C. Knowles

## VR FLEET TACTICAL SUPPORT SQUADRON 24; R5D/TF/TBM (Atlantic)

A well integrated R5D Ground School program for all prospective plane commanders and plane captains with complete standardization in the flight handling and maintenance performed was a vital factor in establishing the squadron's safety record. Movies and lectures on points of safety were scheduled on a daily basis and all personnel were required to attend. A highlight of the squadron's program was an intensive survival training period with emphasis on the survival at sea phases.

Safety Officer—CDR J. M. Naureckas

*"Occasional unstudied comments are made that safety and squadron mission accomplishment are not compatible; that the safety program tends to reduce the aggressiveness and daring required in combat. It is a statistical parallel that units with the highest combat readiness ratings also have the best safety records!"*


## ComNavAirLant

CO—CDR W. Laliberte

### VF FIGHTER SQUADRON 171; F2H-3, -4

The vigorous safety program conducted placed particular emphasis on the constant need for alert and positive thinking. Lectures by ship and squadron officers kept pilots informed of changes in carrier operating procedures. The untiring efforts of maintenance department personnel and a constant desire to provide the finest in corrective and preventive maintenance evidenced the high sense of responsibility felt by every man. In achieving the safety record, if one factor could be singled out, flight preparation and briefing is that factor.

Safety Officer—LT H. B. Southworth

CO—CDR L. B. Jennings

### VA ATTACK SQUADRON 15; AD-6

The success of the squadron's safety program can be attributed to three factors. First, the large part that our outstanding maintenance department played in meeting a heavy schedule throughout the year. Secondly, the importance of the fundamental and basic issues of safety was stressed. Safety is nothing but good common sense, and the pilots have been taught that by using plain every-day "horse sense" they will be safe. The third factor is a close surveillance by all hands of the performance of fellow pilots. Errors are corrected in postflight de-briefings before they become habits.

Safety Officer—LTJG D. E. Fitzgerald

*"Any deviation from the accepted, standardized operating procedures, so laboriously arrived at, places the pilot and his aircraft in that avoidable zone of exposure from which aircraft accidents invariably result."*

CO—CDR E. E. Coonrod

## VP PATROL SQUADRON FIVE; P2V-5F

The safety record can be attributed only to the combined efforts of all hands. Pilots, aircrewmen, maintenance personnel and the line crews have all turned in a job well done despite a complete turnover in pilots and aircrewmen. In pilot checkouts, the squadron always uses the full stop landing. Patron FIVE was awarded the CNO Safety Plaque in 1955 and Battle Efficiency Pennants for both 1951 and 1952.

Safety Officer—LCDR A. W. Smith

CO—MAJ W. A. Green

## GENERAL: HEADQUARTERS AND MAINTENANCE SQUADRON 31; AD/FJ-3/TV-2/SNB/R4D

Highlights of the squadron's safety and accident prevention program: rigid adherence to published safety regulations, excellent maintenance personnel and thorough maintenance supervision.

Safety Officer—CAPT W. M. Walker

## CVA USS *RANDOLPH* (CVA-15)

Analyzing all accidents and incidents which occurred on board during the award period, the safety record of USS *Randolph* is considered outstanding: 11,704 landings were made during the year. ATG-202 was embarked in the ship for the first eight months and the ship was deployed for duty with the Sixth Fleet in the Mediterranean. Returning to ConUS *Randolph* conducted air operations along the East Coast with CVG-4 aboard.

## CVS USS *VALLEY FORGE* (CVS-45)

During the award period, USS *Valley Forge* amassed a total of 2762 landing aboard while participating in refresher training (VS-36 embarked) and three fleet exercises. Indicative of *Valley Forge's* superlative safety performance is the fact that there were no incidents, no ground accidents, and only one aircraft accident aboard during the entire year. This single accident was caused by pilot factors during carrier qualifications.

### ComNavAirPac

## VF FIGHTER SQUADRON 213; F2H-3/F4D-1

Previous CO—CDR W. H. Anderson, Jr.

The outstanding safety record of this squadron was achieved by constantly stressing the professional approach to naval aviation. Each pilot was made to recognize his individual responsibility to promote safe, efficient practices not only in flying the aircraft, but also in every phase of ground handling. CDR Anderson, the commanding officer during the first eight months of the award period, was instrumental in establishing the squadron's safety program by providing close command supervision.

Present CO—LCDR E. B. Salsig

CO—CDR W. C. Bates

Safety Officer—LTG W. M. Bailey

## VA ATTACK SQUADRON 65; AD-6

All pilots contributed to the squadron's safety program through their observance of aircraft limitations, proper pre-flight weather and procedure briefs, and overall safe flying policies. And certainly recognition must be given to the outstanding job our enlisted men did in keeping our aircraft airworthy. The safety record was in fact an all-hands achievement.

CO—CDR J. S. Fahlgren

## VP PATROL SQUADRON 47; P5M-2

This squadron enjoyed an unblemished safety record for the year, including a seven months deployment in the Far East. This record is attributed to the main factors: (1) the use of fully qualified shop personnel in flight crews, (2) safety training and "pushing" of pilots and flight crew personnel, and (3) continuous "hangar" flying wherein safety principles, aircraft limitations and maintenance were topics of controlled discussions.

Previous CO—LCOL E. P. Hartsock

Present CO—MAJ R. P. Mawyer

## GENERAL: MARINE FIGHTER TRAINING SQUADRON 10; F9F-5, -6, -8

Close liaison between pilots and line personnel, aggressive safety-conscious supervisory work of check crews and thorough pre- and post-flight safety briefings contributed to an accident-free year. The maintenance section cannot be commended too highly for their outstanding work. Among both permanent personnel and student pilots, there was a rigidly enforced (yet completely voluntary) "fine" system, based almost exclusively on safety consciousness. All facilities available for training were utilized.

*"Supervision is probably the most important single factor that affects aviation safety. There is ample evidence that the personnel involved in an accident were merely the last to err . . ."*


## CVA USS LEXINGTON (CVA-16)

For the first six months of the award period, USS *Lexington* was deployed to WestPac with ATG-1 aboard. Returning from deployment the ship conducted carrier qualifications and refresher landings for AirPac squadrons. In April, with CVG-12 aboard, the ship again deployed to WestPac. The basis for selection of USS *Lexington's* safety record was air operations conducted as compared with aircraft accidents, ground accidents and incidents in which the ship was assigned primary or contributory error.

## CVS USS PHILIPPINE SEA (CVS-47)

After completing a reserve cruise and refresher training, USS *Philippine Sea* commenced air operations in September, mainly carrier qualification and refresher landings. Two operational exercises were participated in prior to deployment to WestPac in January 1957 with VS-37 (the award winning antisubmarine squadron) and HS-2 aboard. Comparing accidents and incidents for which the ship was assigned primary or contributory error with the air operations conducted was the basis for selection of USS *Philippine Sea's* outstanding safety record.

## *SPECIAL AWARD*

***Attack Squadron 681, NARF Birmingham, is announced as a special award winner. Competing in the CNARESTRA VF/VA Prop division, the squadron completed an accident-free year in AD-4 aircraft. VA-681 was decommissioned on 1 July 1957; at the time of decommissioning, Commanding Officer was LCDR A. A. Shuel, Executive Officer was LCDR D. L. Whitker.***

CO—LCOL W. O. Chapman

Safety Officer—MAJ F. H. Rogers

## CNAResTra

### VF/VA JET: MARINE FIGHTER SQUADRON 221; FJ-2/F9F-4/TV-2/SNB/SNJ

The safety officer has explained the "why" as well as the "what" of aviation safety at the start of each drill period. Despite transitioning to jet aircraft, a complete absence of pilot-caused accidents was the result of the following factors: (1) close observation of each pilot's capabilities and limitations, (2) supervision of flying to observe and eliminate dangerous tendencies as they developed, (3) gradual phasing out of those pilots who lacked either sufficient interest or ability to safely fly jet aircraft, and (4) the willingness of the squadron pilots to accept and comply with the restrictions on certain types of flying imposed by higher echelons.

CO—CDR W. R. Horton, Jr.

Safety Officer—LTJG J. A. Charno

### VF/VA PROP: ATTACK SQUADRON 821; AD/SNB/SNJ

Completing an accident free year, VA-821 has maintained close supervision of pilots' progress in all phases of the training syllabi.

CO—CDR R. E. Easterling

## VP PATROL SQUADRON 881; P4Y/P2V/SNB

Flight safety lectures before each drill served as a reminder to all pilots. Ground handling personnel were also given lectures and safety training. A program to standardize squadron operating procedures and to insure proper indoctrination of pilots new to the aircraft has eliminated misunderstanding and confusion—an ever-present source of accidents in multi-engine aircraft.

Safety Officer—LCDR G. L. Thompson

CO—CDR R. M. Richmond

## HU HELICOPTER SQUADRON 891; HUP-2/SNB/SNJ

The squadron flew their HUPs 1200 miles to perform ACDUTRA and returned the same distance without incident. Through lectures and guidance, the squadron safety officer has been instrumental in promoting a strong participation by all hands in the improvement of squadron mission accomplishment.

Safety Officer—LT F. M. Neely

CO—CDR R. T. Erie

## VS AIR ANTI-SUBMARINE SQUADRON 821; S2F/SNB/SNJ

A freshness in the safety program is maintained as the squadron's safety officer visits other squadrons and gathers new material from these outside sources. New ideas are compared with old ones and evaluation determines the retention of the old or acceptance of the new.

Safety Officer—LT S. J. Weeks

CNARestra

CO—CDR R. W. Tiller

Safety Officer—LT G. J. Suderholm

## VR FLEET TACTICAL SUPPORT SQUADRON 673; R4D/P2V/PBY

Each pilot and crew member has displayed highly commendable flight discipline which reflects the requirement that "all hands" participate in the aviation safety program. Having no incidents, violations or breaches of air discipline further enhances the squadron's accident free safety record.

CNAVanTra

O-in-C—CDR A. L. Lewis

## JET ATU: ADVANCED TRAINING UNIT 201; F9F-2, -5

The unit's safety record was established by teamwork. Each instructor contributed by always exerting the maximum effort in the teaching of his students. Each maintenance man and plane captain contributed by his hard work and attention to the smallest detail of his particular job. Each student contributed by striving for and attaining the high standards of performance required of him by his instructor. In summary, each man, from the O-in-C to the seaman, shared in the effort and each should share equally in the credit.

O-in-C—CDR G. E. Ford

Safety Officer—LCDR W. Hall

## SINGLE PILOT PROP ATU: ADVANCED TRAINING UNIT 105; T-28B

The safety officer instigated a system of thorough indoctrination and safety procedures review, and a semi-monthly compulsory oxygen mask inspection system. The unit flew 22,978 hours without a single accident. Of this total, 1125 hours were on actual instruments while engaged in student training.

*"Safety is an essential element of good business and, regardless of motive, its cost is much more easily sustained than the price paid for the lack of it."*


O-in-C—
CDR W. H. Kilgore

## DUAL PILOT ATU: ADVANCED TRAINING UNIT 402; SNB/JRB/S2F

Continuous and exhaustive efforts marked the unit's safety program, as evidenced by the many innovations for which the unit was responsible. For the S2F, these include: BuAer approval of high visibility paint configuration, designing and building a mobile, padded ditching and bailout training platform, a procedure for intentional wheels-up landings in the event of malfunction (to be promulgated in a future change to the Pilots Handbook), revision of the checkoff lists to cover all items in a proper sequence that affords maximum pilot attention to other traffic, the approach and landing. Plane captains and taxi directors have been provided numerically marked colored jersey shirts; a visor-type blinder for simulated instrument flight was devised.

Safety Officer—
LCDR T. B. Harrison

## CNABaTra

O-in-C—
CDR M. C. Friedman

## OUTSTANDING UNIT: BASIC TRAINING GROUP ONE; T-34B

BTG-1, NAAS Saufley Field, engaged in the primary phase of naval flight training, flew a total of 163,885 hours during the award period while showing a Basic Training Command Improvement factor of 7.56%. This was the highest improvement factor in the command. NAAS Saufley Field is presently commanded by Captain R. M. Ware, but during the major portion of fiscal year Captain J. A. Gamon, Jr., was the commanding officer.

Safety Officer—
LTJG E. G. Thomas

ARE SOME *PLANES* MORE PRONE
TO WHEELS UP THAN OTHERS?!

what are your chances of injury in a wheels-up?

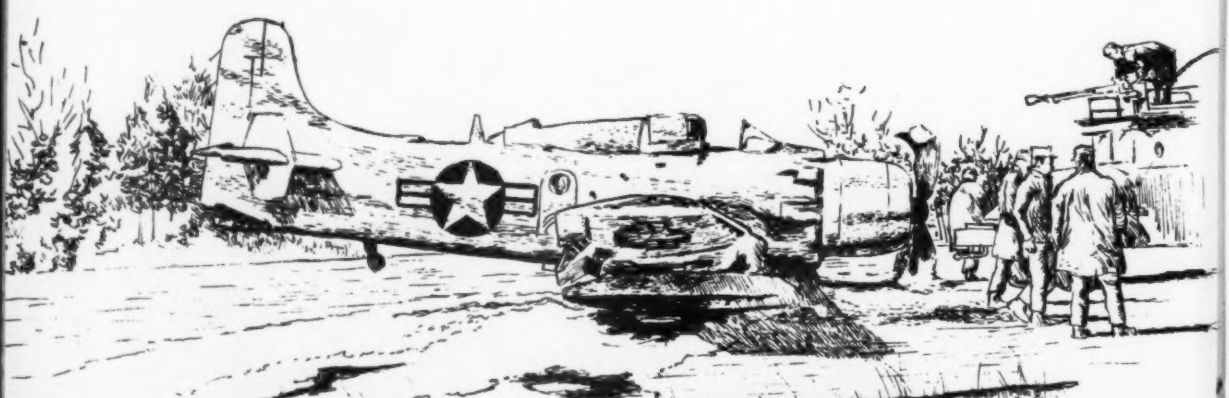
WHICH MANEUVER MOST OFTEN PRECEDES
A WHEELS-UP?

when does the pilot realize he forgot wheels?
what does he do next?

DO YOU TELESCOPE AND TRANSFER?

# DESIGN FOR DAMAGE*

*A Psychological Analysis of Wheels-Up Landings*



AS a result of 56 special interviews conducted by Naval flight surgeons with pilots who made unintentional wheels-up landings, some answers to the questions at left were learned.

This type of accident is more damaging to the budget than lethal, despite its lethal potentiality. Of the 56 accidents investigated, none was fatal, two persons received serious injuries, four minor, and 73 received no injury at all. However, these mishaps cost the Navy the tidy sum in equipment alone of over three and a half million dollars.

An examination of pilots' training involved in wheels-up landings was made in terms of experience in the model in which the accident occurred, and in terms of total flying experience. The data is striking. *Seventy-eight percent* of the pilots who made wheels-up landings had less than 300 hours experience in the model at the time of the accident, and, further, 51 percent had less than 100 hours in the model. The total flying time indicates the same trend. The wheels-up landings tend to occur with greater frequency among pilots with fewer hours.

What do the pilots do when they realize, at long last, that the gear is still securely stored in the fuselage, and the plane's belly is scraping the concrete? The investigation shows that ten added power and attempted a waveoff, but all of these 10 realized that they were not going to make it, and cut the power. Four tried to lower the gear, none succeeded. Eighteen went through the procedure to secure the engine. The other 24 did nothing. These figures are rather revealing in that they indicate that in only 32 percent of the cases were the pilots psychologically prepared to carry out the emergency procedures.

**Touch-and-Go.** Waveoffs have long been suspect as a preliminary maneuver that makes a pilot especially susceptible to a wheels-up landing. The interviews disclosed another maneuver that has much greater potential for a wheels-up landing than a waveoff. This maneuver is the touch-and-go landing. *Twenty-seven* of the 56 wheels-up landing accidents reviewed occurred following a series of touch-and-go landings.

There are probably two psychological factors operating here. One is what educational psychologists call "telescoping." It is the nearly universal tendency to omit responses as the learning sequence is repeated, the pilot unconsciously abbreviates the landing task by leaving out a step. This step is often the wheels-down response with its easily observed result.

The other factor is a "transfer" effect. The pilot has put his wheels down in a series of previous landings containing exactly the same stimuli as the present one. As the stimuli are the *same* in the two situations, the pilot has a strong tendency to believe, through the medium of transfer effect, that he has made the motions normally connected to these stimuli, i.e., he *thinks* he had put the wheels-down during *this* landing situation, but actually he did it in the previous landing sequence.

These two factors will help explain the large number of wheels-up landings in which the pilot is "certain" that he activated the wheels-down mechanism. Of the 56 pilots interviewed only three admitted that they "just forgot to lower the wheels." The other 53 were fully convinced that they had lowered the gear. Some of the pilots may have been protecting themselves, but the flight surgeons were convinced that most were telling the truth.

**Omissions.** Wheels-up landing accidents are the rather spectacular results of an error of omission, rather than commission, and are of importance in themselves, but, perhaps, of greater importance is the fact that they are the objective evidence of other errors of omission. That is, a sizeable number of pilots are failing to lower their landing gear despite the elaborate warning systems in use—and many who fail are warned in time to prevent the actual landing.

How many other errors of omission are being committed in the landing pattern—or during takeoff and in flight—of which we are unaware? Errors that

Please turn page

*Based on a paper recently presented to the Annual Conference of the Aero-Medical Association, at Denver, Colorado by Dr. Frank P. Gatling, Head, Human Factors Division, U. S. Naval Aviation Safety Center.

# DESIGN FOR DAMAGE

Continued

are resulting in much more serious accidents than wheels-up ones. (*Anymouse Reports, please.* —*Ed*)

The psychological point is that an error of omission is not too difficult to make in spite of the fact that the pilot is surrounded by warning devices of sounds, lights, and flares, etc., and is convinced completely that he has performed the task omitted. This is a most insidious type of error.

**Not Pilot "Goof-Off".** Should the question be asked "are all involuntary wheels-up landings purely psychological?" the answer must be yes. But a further investigation of the data strongly suggests that there is more than just a pilot "goof-off" involved.

Let us compare some wheels-up landing rates. First, a comparison of jet rates with prop plane rates indicates a large difference. The jets have almost 2½ times as many wheels-up incidents per 10,000 landings as do prop planes.

When we compare single-place jets with single-place props, a large difference still exists. The single-place jet rate is twice that of the single-place prop rate.

And when we compare airplane models in their own category we find wide differences too, for example,—the wheels-up rate for one jet fighter is nearly *three* times that of another model jet fighter!

**Design for Damage.** These large differences in the rate at which pilots have wheels-up landings in jets *vs* props and in specific model *vs* specific model cast strong suspicion on the idea that the pilot alone is the culprit in these accidents. It appears that in some aircraft situations exist in which the pilot is far more susceptible to psychological error than in others. These are situations that have been designed by others and in which the pilot is an unwilling victim.

This is further illustrated by the difference in rates for multiple-seat planes as contrasted with single-seaters. The multiple-seat jet rate is .12; the single-seat jet rate, at .31, is 2½ times as high. Multiple-seat props have a rate of .08 which is doubled by the single-seat prop rate of .16.

There is one psychological variable that is undoubtedly involved in these rate differences, and that is the very strong tendency for humans, when in the presence of other humans, to adhere more strictly to socially established regulations, such as landing checkoff procedures.

**Distractions** were reported during the landing sequence by a little less than half of the wheels-up pilots. This includes 10 of the pilots who failed to lower their landing gear following touch-and-go landings. Of course, the real question is "when is a distraction distracting?" for many distracted pilots avoid a wheels-up landing. This question can not be answered completely, but an analysis indicates that a disturbance that forces the pilot to postpone lowering his wheels beyond the point at which he usually lowers them is the most damaging kind of distraction.

**In summary,** the analysis of the 56 wheels-up interviews indicates:

a. that they occur as a complete surprise to the pilot

b. that touch-and-go landings make a pilot particularly likely to commit an error of omission and make a wheels-up landing

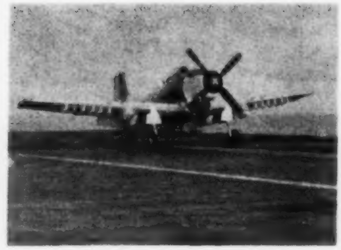
c. that many other errors of omission must be occurring

d. that design factors are strongly involved in causing the pilot to commit errors of omission. ●

**WHEELS-UP "SAVES"**—To date, the most effective means of keeping pilots from forgetting to lower their wheels appears to be the posting of a "Wheels" watch on landing runways as required by OpNav Inst. 3750.7A dated 9 Oct 1956. The payoff is reflected in this box score.

| Major wheels-up landing accidents (pilot caused) | |
|---|---|
| 1 Jan 1956 thru 1 Sept 1956 | **44** |
| 1 Jan 1957 thru 1 Sept 1957 | **23** |

Taking a premature cut, the AD hit and bounced . . .



. . . settled to a 3-point attitude . . .

. . . minus the hook point.

# truth and consequences

A DIGEST OF SIGNIFICANT AIRCRAFT ACCIDENTS

Brakes and rudder . . .

. . . failed to help.

**ANTICIPATED CUT**—A pilot with 460 hours in the AD, and 20 CV landings in model, began a mirror approach which was normal until the final phase. When approaching the cut position the senior LSO noted, "he was flying a steady glide path but with insufficient power, and was decelerating as he approached the ramp."

The LSO working the approach immediately said "Power" over the radio but instead of adding power as the LSO intended, the pilot took a cut. As the AD descended, it went into a nose-high attitude. The tailwheel, hook and rear fuselage struck the ramp, while the main gear touched down approximately 15 feet forward on the flight deck.

The impact damaged the hook and when the tail returned to a 3-point attitude after a high bounce, there was a 6-inch pull on the number 3 wire before the hookpoint slipped off. Full brakes and right rudder were applied and the plane swerved from alignment with the angled deck to approximately parallel with the axial deck. However the resulting turn was insufficient to remain on the axial deck and the plane fell over the lip of the angled deck in a right skid. The pilot was not recovered.

The accident board noted that with the canopy open, the noise level in the cockpit of the AD is such that accurate radio reception is often very difficult. The pilot was relatively inexperienced in carrier landings and was anticipating the cut and his immediate reaction to the word "Power" indicates it was either misunderstood as to intent or was not clearly received.

# truth and consequences

Continued

There were 4000 pounds of fuel in the tanks when the F9F-8 pilot began his approach and at this weight he was used to a longer runway than was available. To make matters worse, the runway was wet and the winds calm.

**SHORT HAUL**—An F9F-8 pilot with 117 hours in the *Cougar* arrived over a Pacific island civil field and called for landing information. The tower gave the wind as SW, 5 to 8 knots, and offered him a choice of runways. He chose the longest (runway 26 with 6500 feet) and made a 360 degree turn over the field to observe approach and landing conditions.

A rain shower had just passed over the field and the runways were wet and spotted with shallow pools of water. Forty minutes fuel had been burned during the flight to the civil field with an estimated 4000 pounds remaining.

Added to the factors of a heavy plane, a wet runway, and light winds, was another point of interest. The pilot's previous landings in this model aircraft had been on an 8000-foot runway under lighter landing loads. With these four items progressively weakening his chances for an uneventful landing, the pilot elected to try it anyway. He rejected the alternative of burning down to a lighter weight because he was to fly the plane back to home base that afternoon, and by landing just under the maximum weight,

he would not have to bother with refueling.

"With gear and flaps down and 4000 pounds of fuel remaining," said the pilot, "I proceeded with a normal approach—reaching the 90-degree position at 500 feet and 150 knots.

The *Cougar* touched down on the numbers at approximately 125 knots. After about 2000 feet of roll the airspeed was down to 100 knots and the pilot made a test application of the brakes with normal response. From that point on it ceased to be a normal landing.

About 3000 feet down the runway another application of brakes was made, followed by vigorous pumping of the pedals which resulted in what the pilot considered less than the accustomed rapid decelaration. With 3500 feet behind him, he added power momentarily for a waveoff then decided against it and cut back to idle.

He continued braking action but did not use emergency braking for fear the plane would spin out of control on the wet runway. With 2000 feet of runway in front of him, the pilot attempted a groundloop without results. At the 5500-foot spot, with the boondocks coming up rapidly, he tried to jerk up the gear and slide to a stop, but this also was unsuccessful. At the same time an unexplained application of power was heard. A jet-qualified pilot 800 feet away estimated it to be about 60 percent. This power remained on until after the aircraft finally came to rest.

At 40 knots the runaway *Cougar* went squawling through a chain-link fence, tore through 100 yards of lawn, crossed a hard surface road and hit a 4-foot high ridge of lava rock immediately beyond. Forward motion stopped 650 feet off the end of the runway when the *Cougar* slewed into an 8-foot-deep crater surrounded by lava rock and a jungle of vegetation. The engine continued to turn and the pilot was able to stop it only by placing the fuel master switch off.

The board considered the addition of power at the 5500-foot point resulted from the pilot's striking the throttle when he reached for the landing gear control lever in his attempt to retract the gear. It was also considered that his decision to land under the existing conditions was unsound and recommended that all pilots flying the F9F-8 be required to make practice landings of varying loads on a runway of suitable length prior to attempting a landing under these conditions on shorter runways.

**SAFETY (?) WIRE**—A prospective PPC with 52 hours in the P5M took off on an instrument training flight. After about two hours he decided to get some single-engine training time. As it turned out, he received much more than he asked for.

At an altitude above 6000 feet he feathered and secured the port engine and boosted the starboard engine to 42 inches and 2600 rpm. This high power operation continued for about 10 minutes with the engine apparently normal in all respects. After that the port engine was unfeathered and warmed up at about 1200 rpm. Shortly thereafter the starboard lookout reported heavy smoke from the starboard engine, followed quickly by a report of fire.

The copilot handled the emergency fuel and oil cut-off switch and feathered the starboard engine. The pilot applied power to the port engine and attempted to activate the methyl-bromide fire extinguisher. He tugged and struggled with the switch but *the safety wire protecting the switch could not be broken!* Fortunately, the starboard engine fire was reported out a few seconds later.

The crew's sigh of relief which followed was suddenly shattered by a report that the engine was burning again, this time for sure. A hole appeared in the accessory section and flames were visible inside the cowling. Once more the pilot tugged at the fire extinguisher switch but again he could not break the safety wire.

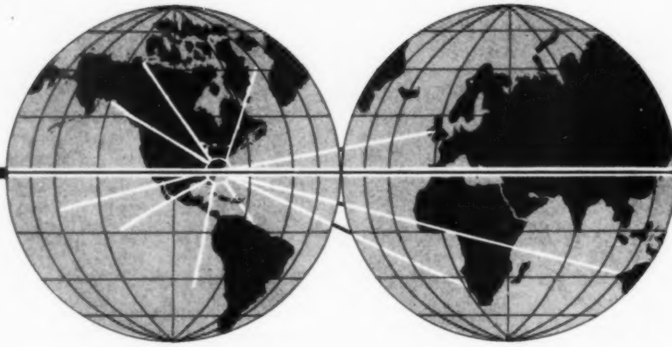
He called for pliers while the co-pilot put his more youthful muscles to work on the switch—in vain. The wire remained intact. To add to the seriousness, one crewmember reported flames were streaming back the length of the plane.

In the midst of this crisis the first mech, who was on the fuel panel, produced a dzus key and broke the wire. The copilot immediately pulled the extinguisher and the fire went out. The crew then made an uneventful return flight home—single engine, sure enough.

An endorsement on the accident report by the commanding officer noted that all aircraft assigned to the squadron had been inspected and no other nonstandard safety wire was found. "In addition, appropriate action has been taken to insure that high tensile strength safety wire is *not* used in the future to secure emergency switches."

Continued on page 24

# MONITOR



**Self Supervision—**

In a recent Navy accident where the pilot bailed out at night due to vertigo, it was discovered that the pilot had driven 300 miles to attend the drill. Fatigue was a contributing factor since the pilot had already done more than a day's work without rest before his flight. Commanding officers can instruct pilots to eat the proper food and get the required rest, but the individual pilot must exercise self supervision since he is the only one who actually knows what he has been doing in the past 24 hours.—*MARTCom.*

**Better Late Than—?—**

Just recently another wheels-up landing occurred because the duty officer did not utilize all means available to him to give warning or signal a waveoff. He did tell the pilot in a normal voice to take it around. As the plane slid by the unit on its belly he was heard to scream, "LIMA FOXTROT, TAKE IT AROUND!" The Aldis Lamp and flares were available but not used. *MAG-32.*

**Taxi Traps—**

An accident which was the result of the failure of the concrete edge of a gas pit was brought to the attention of the council. As crowded parking conditions may prohibit taxiing around these gas pits, all activities are requested to check the gas pits in their area for rusted covers and crumbling concrete.—*ComAirPac/ ComNABS 11*

**Hot Rafts—**

A fire hazard exists when life rafts or other emergency gear are stowed too close to overhead lights. A recent incident was noted where a life raft was partially burned while it was secured against an overhead cabin light. All personnel are cautioned to stow emergency equipment in the proper place.—*FlogWingPac.*

**Night Confusion—**

Complaints have been received from several sources relative to rows of lights at Ewa Beach and at Nanakuli, Oahu that have the appearance of runway lights when aircraft are making an approach to runway 8, Honolulu Airport at night. Several reported near accidents have occurred where pilots have realized their position in sufficient time to abort an attempted landing. Action has been taken in cooperation with the local CAA Safety Inspector. One row of lights has been shaded, eliminating the two rows of lights that had the appearance of runway lighting.—*ComFairHawaii*

**EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.**

### Color Coding—

The Committee proposed the idea of marking fuel trucks with a large painted panel of the same color as the fuel the truck is designated to deliver. Also around the nozzle of the hose, paint a band of the same color. Further, around the filler neck of the aircraft's fuel tank, paint a circle of the same color. Thus anyone who is not color blind can be capable of refueling an aircraft with the proper fuel.—*ChiefNaTechTraCen*

### Check Point Problems—

**SAR stated that there was a great number of check points utilized by units that were not known by Search and Rescue. He asked all safety officers to check and make a list of these points along with their corresponding latitudes and longitudes plus the common local names used and forward this list to SAR. He stated that these lists would help in case an emergency was declared and the position report was made relative to one of these locally named fixes.—*CNaBaTra***

### Wait for the Wagon—

It was pointed out that on occasions aircraft have declared an emergency and have landed before the crash and fire equipment could be spotted along the runway. All units were informed that unless the nature of the emergency dictated otherwise, aircraft declaring an emergency would be required to circle the field until the crash and fire equipment were spotted. All pilots unable to circle the field due to the nature of the emergency should so notify the tower if practicable.—*FAW-6*

### Fire Hazards—

It was noted that recent FLIGA Reports also indicate a need for additional emphasis on shop safety to reduce the incidence of injury to personnel and damage to aircraft and equipment. In this regard, a trend or tendency towards blocking fire-fighting equipment in the hangar area was also noted. In addition, fire plugs in the hangar area are frequently blocked by parked automobiles.—*Quonset Sub-Area Aviation Safety Council*

### About The Little Things—

"Big things are easy to see, but it takes patience and preseverence to keep after the little things. Anybody can see a break in the water main when it blows the pavement ten feet in the air, but it takes discerning management to detect the little leaks that can undermine a business." ( *American Management Association, March 1957*)

# truth and consequences

Continued

**GONE GAS**—During a morning hop the F9F-6 pilot had wing fuel available and his flight was conducted at 32,000 feet. He was assigned the same plane for an afternoon hop and accepted it, knowing he would have only fuselage fuel; wing fuel was not available due to a material discrepancy.

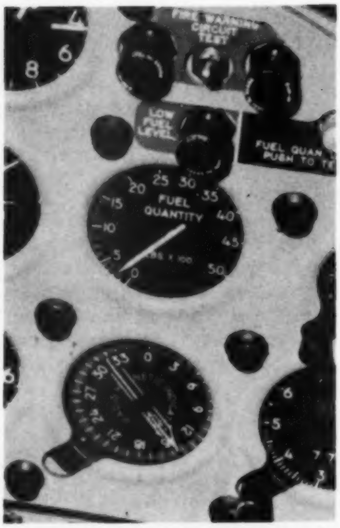
Afternoon weather became overcast from 8,000 to 14,000 feet and the second flight was conducted mostly at 8,000 feet with consequent higher fuel consumption.

About 55 minutes after takeoff, the F9F-6 was over the air station at 8,000 feet. The pilot swung wide during his descent into the pattern and noticed he was indicating 800 pounds of fuel. In error he made a right break (left traffic at that field) then went wide to the right, reversed course to the left and rejoined the pattern on downwind.

"I then advised the tower 'low state,' they immediately cleared the field and cleared me to land. The last time I checked the fuel level I had 250 pounds on the last part of the downwind."

Turning base the engine flamed out. A gear-down landing in an open field was made without injury to the pilot.

Investigation of the fuel tanks showed that all usable fuel had been consumed. The fuel quantity indicator registered 200 pounds when observed at the crash site.




All usable fuel had been consumed but the quantity indicator registered 200 pounds when observed at the crash site.

The minimum fuel policy for F9F aircraft was 1000 pounds at the break for local hops other *than fam flights*. "If for any reason," a training instruction reads, "a pilot returns with less than the above fuel minimums, he will notify the tower, prior to entry into the traffic pattern, in sufficient time to allow a priority landing assignment to aircraft with the least amount of fuel remaining."

**NIGHT FLIGHT**—On a late November morning, three HRS helicopters departed their East Coast base for a cross-country hop to a Gulf Coast base. When making their second fuel stop, they were a little past the halfway point of the trip, and the landing was made at twilight.

After an hour the flight was ready to go again. The clearance weather for their next fuel stop was given as 2000' broken with 3 miles visibility in light rain. Minimum ceiling was forcast as 1000' overcast with 5 miles minimum visibility at flight level.

As it turned out the destination visibilities were recorded as 8 miles but the temperature-dewpoint spread was one degree at 1830 and went to 4 degrees an hour later. In general the flight was headed into an area of "low pressure under minimum possible marginal conditions for night helicopter operations."

The flight departed at 1810 with a check from the tower for altimeter setting. Highest terrain along the leg was 790 feet so the flight was briefed to fly a loose formation at 1200 feet.

All went well for an hour, except that the aircraft proceeded into an area of lowering visibility and ceilings. The tendency of the pilots was to drop lower in light rain showers in order to remain contact. When first meeting the rain, the wingmen moved to a closer position in order to keep visual contact with the

The pilots flew a loose wing position until they entered rain showers. Then the flight went into unexpected fog.

flight leader; then suddenly, the helicopters were in low clouds.

"The next thing I knew," said the right wingman, "my copilot told me to pull up, (the copilot had seen tree tops). I immediately pulled up and noticed my altimeter read 600 feet and then 1000 feet. I leveled off at 1000 feet and was intermittently losing sight of the leader." The leader turned on his landing light and began to climb, then turned off his landing lights. Over on the right, the wingman had a feeling he was overrunning, caused partly by the sudden glare of the lights on the trees below the leader, and he commenced a climbing right turn. Disorientation resulted and the HRS went into a diving spiral to the right.

Due to the reflection of the exhaust stack and navigation lights on the wet windshield and low clouds, the copilot was blinded to the extent he was unable to help control the aircraft.

The pilot regained cyclic control and called for landing lights. Seeing the ground coming up, he pulled back abruptly but the aircraft hit in a nose-high attitude and the main rotor blades severed the tail cone and tail rotor. An uncontrolled turn to the right resulted and then the HRS hit on the right side of the cabin and began burning. By good fortune, the crash site was in a clearing surrounded by thick pine forests. The crew chief received minor injuries but the pilots were uninjured.

The flight leader estimated that only about 10 seconds was spent in the cloud or scud until he broke out in the clear. One weather officer familiar with the area said it was possible that the actual weather was much worse between the reporting stations than was indicated by the sequences. Under similar circumstances pilots had often reported poorer weather over the rising terrain of the area.

In the opinion of the board there had been inadequate briefing on emergency situations in case a plane went down or unexpected weather conditions were encountered. A secondary cause factor of the accident was assigned to the flight leader for "inadequate briefing, proceeding into weather conditions wherein continued VFR flight was doubtful, and erratic flight maneuvers."

# NOTES FROM YOUR flight surgeon

### CARBON MONOXIDE CONCENTRATIONS

DURING extended periods of crosswind taxiing, keep the AD canopy closed to prevent carbon monoxide contamination in the cockpit. If smoke or toxic fumes enter the cockpit, use the oxygen mask with the regulator set for 100 percent oxygen. Do not open the canopy, as the draft may cause additional smoke to enter the cockpit.

Also, carbon monoxide concentrations can occur under high-power/low-airspeed conditions if the aircraft sealing is not meticuously maintained. So be sure and test for carbon monoxide contamination at each 120-hour check as instructed in the maintenance handbook.—*AD—SIS—1957*

### FATIGUE FACTOR

THE AD was returning from a sea search for a missing pilot. The approach was high and the pilot cut when the ship was at the bottom of a cycle. As the deck started up he attempted to flare. The hook caught a wire, tailwheel broke off, the plane pitched forward on to the main gear, and the starboard gear folded. The hook held and the plane was arrested. Fortunately, all three men escaped injury in this crash.

Several factors combined to play a role in causing this accident—restricted forward visibility from salt spray accumulated on the windscreen during flight, pitching deck, and fatigue. The actual cause is attributed to poor landing technique. In this, fatigue undoubtedly played an important part, adversely affecting the pilot's judgment and ability to react quickly to recognize and correct a bad situation.

This was his third hop in 24 hours. He had a late night hop the previous night and was kept in a standby status for this search mission which had been going on since the previous night. As a result he had only 2 hours sleep in this 24-hour period.

There were operational commitments to be met in this situation. There had been a heavy flight schedule the previous day to which was added the sea search. Under these conditions it would not be operationally feasible to insist the pilot cancel the hop. The potential hazards of flying under such conditions must be recognized and expected.

### INVESTIGATION

UPON investigating a fatal F9F-6 crash, a careful microscopic examination of the handle of the face curtain and the pilot's left glove revealed fibers resembling those of the glove on the inner surface of the handle.

Microscopic examination of the canopy cutting blades on top of the ejection seat showed no evidence of contact with the canopy, either by finding particles of plexiglass or by surface scratching of the blades. This indicates a normal ejection using the pre-ejection lever.

## HEAD STAND

**MAYBE you've complained about your hardhat—but there is one pilot with a new appreciation of its rugged qualities.**

**His helmet *actually supported an AD,* which otherwise would have crushed his head.**

**He landed high and hot, blew both tires after locking the brakes trying to stop, and nosed over, with his head wedged between the side of the cockpit and the ground.**

**Apparently the hardhat was holding the aircraft up, because digging beside and under his helmet caused him to complain of increasing pressure. So, he was not released until after the cherry-picker lifted the tail.**

**Digging also might have allowed the plane to settle, forcing the pilot's head into a pool of gasoline, with consequent drowning.**

**The pilot had to pull his oxygen mask slightly away from his face in order to breathe as the tube seemed to be fouled, but there is no doubt that the mask prevented loss of life from suffocation by leaving an air pocket for him to breathe from and keeping his nose and mouth free of mud and debris.**

An autopsy of the pilot revealed that there was no bleeding from any of the wounds; that death was instantaneous. Neither heart disease nor small hemorrhages of the brain were found, so heart attack and head injury prior to death could be ruled out. The pilot did not leave the seat and was killed by impact forces.

This microscopic evidence substantiated the conclusion that this was a low altitude ejection.

### RE-MEMBER

SUPPOSE you now have, or sometime will have, automatic bailout equipment—automatic seat belt and automatic chute opener.

*If you open your lap belt manually you MUST open your parachute manually also.* This must be re-emphasized, re-iterated, relearned, and re-membered:

When you open your lap belt manually it's just as if you opened it to leave the plane on the ground after landing. *The chute does not open automatically.*

A lap belt opened automatically separates on the other side of the buckle, and trips the chute opener.

Re-member.

### RE-MINDER

IF YOU do not take your annual physical within the prescribed period you are required to write a letter, via your CO, to the Chief, Bureau of Medicine and Surgery, explaining why.

It is the responsibility of the individual officer to make and keep the appointment for his physical.

That's a surprise? Well, you may have had one of those medical officers who have sometimes found time to send for their unit officers by name, and by strait jacket if necessary, to insure the annual physical. This was strictly the doctor's own helpful spirit and not his responsibility.

It's *October* now—so get your physical before 31 December. And—the usual appeal for all periodic inspections—please don't wait until the last minute!

### SOMETHING BORROWED

INVESTIGATION of a fatal crash showed that severe decelerative force snapped the pilot's head and upper body forward and to the right. His shoulder harness had been unlocked and moderately slack.

The poor fit of the *borrowed* helmet coupled with its own inertia permitted it to ride further back and up on the pilot's forehead, leaving it exposed to severe skull damage. The right arm was fractured when the pilot was tossed laterally against the cockpit coaming and the same motion fractured the right thigh against the right canopy ejection handle.

Possibly this pilot would have survived this crash had he locked his shoulder harness preventing fatal head injuries, although he would most likely have received the arm and leg fractures.

Borrowed APH-5 helmets, even when they are the right size, may have a poor fit because of individual fitting of foam inserts.

The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

## MY HAIRIEST

"I was in an A4D-1, chasing a hooded local instrument flight. After a radio check I cleared the lead pilot to go hooded. After reaching level off altitude, 37,000 feet, the lead pilot remained at military power and I started falling behind.

"I tried to call him but received no answer. For 15 minutes I called him on all channels including guard —no answer. A B-47 passed directly to the rear of the lead plane—at the same altitude—a real close one!

"During the debriefing I found he had switched channels to get a parrot check and had remained hooded. The GCI station asked for his position—and here's the real kick. He said, 'I'm hooded and haven't had any contact with my chase pilot for 10 minutes, so I don't know where I am.' He then remained hooded until I caught him in a turn and gave him some jet wash.

"When asked why he stayed hooded without the normal two-minute clearing call from me, and why he didn't reduce his power to cruising, and why a lot other things; he was vague and his feelings were hurt. This was no newly designated aviator either. How to prevent this type near-miss? You tell me!

"This was my hariest experience. I thought for sure he was a goner. I could see the headlines—'Jets collide over . . . !' "

*Could some oxygen difficulty explain buddy's lack of control?—Headmouse.*

## PUPPETEER

"I AM strictly the third person in this case, but it's certainly worth mentioning.

"We were recently deployed on a CVA for the Med and our squadron LSO (VF type) came into the readyroom one day, shaking his head and emitting unintelligible mutterings. Seems as though he sat in on a post-recovery debriefing between the skipper and LSO of a multi-engine CV squadron. The CO was heard to say 'Dammit, haven't I always told you that I'll nod my head when I want a cut!'

"We've all been shaking our heads over this one—any comments?"

*Censored!—Headmouse*

## DAMP PULLOUT

"ON THE first run of a strafing hop I almost flew into the deck on an extremely low pullout. Luckily the pullup heading took me over water because I saw the altimeter coming up through zero.

"Entrance to the dive was sloppy but the run became normal. The first burst was fired at approximately 1400 feet, a short pause, then the long burst. When I got my eyes unlocked from the target, things started looking mighty big. The normal pull-out G didn't seem to be sufficient; the descent was terminated at what seemed to be water level with 9.5 G.

"As was mentioned in debriefing, when the banner fills the correct

amount of mils in your gunsight, that is the time to break off the run. This does not rule out the use of your major instruments however."

### FORGOTTEN CHECK

"WHEN I was climbing through 32,000 feet in an F3H-2N, I experienced vertigo and channelized vision. I immediately checked my oxygen regulator, noting it wouldn't blink—I was on 100 percent. Safety pressure was switched ON but I felt no breeze of oxygen. I realized then that I was not connected to the oxygen bottle.

"By this time I was back down at 20,000 feet with a cabin pressure of 10,000 feet. Feeling better, I felt there was no need to pull my bailout bottle and I landed without further incident. I think next time I would probably use my bailout bottle because I still felt a bit 'rocky' after climbing out of the plane.

"I got hypoxia because I didn't properly check my oxygen system prior to takeoff. The ejection seat had been removed from the plane and when reinstalled, the oxygen fitting was not properly hooked up. A proper check would have prevented this difficulty. I recommend a specific check each time you plug the mask into the connection.

"I plugged my mask in, then started the plane, figuring I'd check my oxygen system after start—I didn't."

### BIRD-DOG MYSTERY

"I HAD been holding over the Long Beach range in an F9F-8 for approximately 20 minutes and then received clearance for a penetration. The penetration was normal in all respects until returning inbound to the station. The top of the overcast was 3000 feet, and I leveled off on the top while I was getting a GCA channel.

"Communications established, I reported my position as inbound on the published inbound heading. GCA acknowledged and asked that I report low station. It was not long before I realized that I should have had station passage and I rechecked the ID signal and retuned the station. All was correct and it came in loud and clear.

"I also spun the needle in the loop position and the needle always returned to the nose. Fortunately, I was familiar with the area and realized that I was well past the station. The further inland I went the more the overcast was breaking up and I finally located myself over Norton AFB some 50 miles from Long Beach with the needle still on my nose.

"Due to the unreliable ARN-6 and UHF transmission difficulties, I elected to proceed VFR to George AFB over in the Mojave area. As

I finally started to climb my needle spun around several times and finally pointed back at the station, much too late to be of any help to me at this stage of the game.

"Why this happened I do not know. When I got George AFB homer tuned in, the set operated

# anymouse
## and his hairy tales

# anymouse

## and his hairy tales

Continued

properly and gave good indications. I had the set checked, and of course, it ground-checked OK. All the leads were tightened and the set has operated properly ever since.

"This is the second time that I have had a good ID signal and yet the needle was 180 degrees out of phase. The first time it happened, I became aware of the danger of such a situation, but made no effort to find a remedy for such a problem. It is the feeling of many aviators, that if the needle is tuned in properly it will always point in the right direction and if not, there is nothing else you can depend on. As always said, you have to believe your instruments.

"This is the fallacy of this situation: You do not have to believe your instrument *if you take the time to figure out* when you should recross the station on your inbound heading after leaving high station. *There are some fields that leave you little time to continue over a station without the danger of colliding with the side of a mountain* even if the instruments are all reading right. Remember that the clock is still ticking on and it is later than you think.

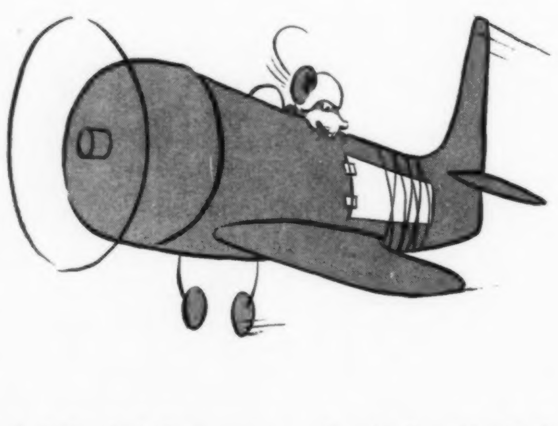
"It is seldom that anyone has to use the emergency altitude given on all letdown plates but this is about the best time I can think of using such information.

"Someone else may be in the soup and may not be as lucky as I was to be VFR at the rare time the phenomenon occurs. I know that I will time all of my penetrations so that I know what time I should be over the low station."

*Someothers have not been as lucky.—Headmouse*

### CRUTCH

"ON a deferred emergency approach I found myself slightly high and slightly fast in an



AD-6. As I already had my power off, and my flaps and gear down, I reached for the divebrake handle.

"Since a recent service change wires off the divebrakes unless there is 1½ degrees nose-down trim, the procedure of throwing in forward trim, pulling back stick, and waiting for the switch to actuate doesn't allow much concentration to your landing. Especially when you have to reverse the procedure after you have slowed down.

"If I had made a perfect approach I wouldn't have needed divebrakes, and since I had a very long runway I didn't need them. But woe unto the poor aviator who finds himself making an emergency approach on a short runway, and in an overzealous attempt to avoid landing short, finds himself landing long. By the time he gets through the procedure of extending his divebrakes, he might as well have made his original approach for the boondocks.

"To me, divebrakes are a crutch I could lean on as is most safety equipment. Please give it back to me."

*I suspect the reason the "boards" were rewired was to prevent other Anymouses from inadvertently landing with their divebrakes out.—Headmouse*

## WHICH WAY TO TOWN

"TWO wingmen and myself were filed VFR on a 490-mile ferry hop to deliver three F2H-1 aircraft. When we were about 16 minutes out from our destination I called for the present weather. It was IFR, and since we could not change from VFR, we immediately turned back for the alternate. Thirty minutes before we had passed it and noted only broken clouds, estimating the bottoms at 3500 feet.

"Our second time over the alternate we had 1800 feet broken and another layer of broken clouds at 15,000 feet. I was homing on a commercial broadcast station because of its increased range and, as we got station passage, none of the three aircraft could receive the range facility.

"A UHF/DF steer was requested but we found the equipment was inoperative. We shut down one engine to conserve fuel and by this time we had insufficient fuel to do anything but stay put.

"With no range or DF steers available, an attempt was made to bring us in on radar. After five minutes of turning knobs and asking our heading, altitude and approximate position, the controller told us he was unable to get his scope in working order. Number 3 man had a fuel low warning light and things were looking grim.

"We asked the tower operator the position of the field in relation to a railroad yard which was sighted through a hole. He positively identified the yard, stating the field was to the west. We hesitated to go below the clouds because of the poor visibility. Finally, I happened to sight the field through a hole. I led the flight down through it and into the break with the number 3 man indicating 400 pounds. An F2H-1 fuel gage can be off as much as 400 pounds. We again passed over the railroad yard while proceeding *eastward* toward the field!

"After some Monday morning quarterbacking by the three of us, I could kick myself (four other feet also volunteered) for not considering the distance and bearing from the commercial station to the field as given in the Supplementary Flight Information Document which I had used just prior to takeoff to obtain the commercial frequency."

## HALF A LOAD

"STATIONED aboard a carrier during a one-week deployment with my Marine squadron, I was scheduled for a morning flight. Everything being rushed as usual, I barely had sufficient time to complete the major checkoff points on my F9F-5 when the cat shot me off.

"Immediately thereafter, the plane banked rather viciously to the right, lost altitude and disappeared from the Captain's view under the bow. Fortunately, I didn't go into the drink, though it was too close for happy thoughts.

"Getting back into the pattern, I dumped the tip fuel, gathering the facts to fit the situation; one full tip and one empty one. Later I found out that the word on filling tip tanks had been changed in the morning—apparently while some nice young sailor was filling those of my plane—whereupon, he obediently ceased what he was doing.

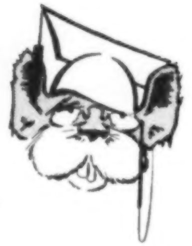
"Since the wings were folded when I got in the plane, there was no way of checking other than transferring on the deck, and there was no time for that, without unduly upsetting the catapult officer's patience and/or ulcers.

"I would suggest, (1) have the planes inspected shortly before a flight by either crew chief or pilot and (2) allow the pilot a few seconds more time before being catapulted, to thoroughly check his plane. It's nice to be an efficient pilot when war comes, but, one has to *be* there too, methinks."


**Anymouse and Headmouse often assist in special projects of the Naval Aviation Safety Center. For this reason they would like from you via, Anymouse Report forms or official letters, any ideas and experiences not previously reported concerning . . .**

- √ formation collisions, suggestions for preventing yet retaining training and fleet requirements—
- √ common or standard procedures that have *overlooked* accident potential—
- √ problems and suggestions re GCA facilities, procedures—
- √ techniques which have improved squadron morale and efficiency, and thus increased safety as a professional by-product—

P.S. Just because these specific topics were mentioned, don't forget to send us a report on anything you've learned that you think will benefit others—Your pals, A & H. Just address Director, U.S. Naval Aviation Safety Center, NAS, Norfolk 11, Va.



# HEADMOUSE

**Have you a question concerning aviation safety? Send it in to Headmouse NASC, NAS Norfolk 11, Va. on an Anymouse Report and he'll do his best to help.**

SOME TIME between Confucius and Will Rogers a venerable sage made the observation that an apology is like beating one's head against a brick wall—it hurts while you're doing it, but it sure feels good when it's over.

To all of you who have been waiting for more dope on personal equipment as we've promised, our sincerest apologies. And to those who took the trouble to write in and remind us of our unkept promise, we add our thanks for jolting us into action.

The itemized information that follows is the latest that we have on availability of personal equipment items. Not all of it is good news, and the expected delivery dates are not our promises, they're dates appearing in contracts. (Figures concerning actual deliveries were taken from Fleet Logistic Support Bulletins.)

**APH-5 Helmets**—Ten thousand helmets have been delivered by the manufacturer as of February 1957. Fiscal 1958 plans were for 25,000, but procurement was limited by $ to 10,500. Delivery of these is scheduled to commence in September. Delivery may be delayed by the possibility of design charges. *See ACSEB 3-57, 5-57, 13-57 for additional info on helmets.*

**APH-5 Helmet Spare Parts**—First shipments on 25 spare part items were made in June. Neutral tinted visors are not included in this first procurement, but a contract has been awarded, delivery expected in September. Among the spare parts, are buttons, ear cushions, edgerolls, visor housings and spring clips, liners, phone housings and shims, ear cushions, tab sets, and chin straps.

**Gloves**—Reports of color bleeding held up production and then the contractor had a fire. Over 81,000 pair were shipped in the 13 months prior to May, which just about replaces the quantity issued during that period. Shipments will continue at about 7000 per month until completion of current contracts. *Note:* —As of 5 July a total of 96,263 pairs had been shipped.

**A13A Oxygen Masks**—Nearly 30,000 were shipped in the four months prior to April 1957. Delivery of another 15,000 began in June. Mikes fitted poorly in the small and medium masks of one contractor. ACSEB 16-57 of 7 June prescribes fix for those masks.

**Z-2 G-Suits**—Over 3500 have been delivered (26 July) on a contract for 18,950. Increased use of jets in the training command has greatly increased demand for G-suits and oxygen masks, the current G-suit contract should relieve the demand. The Z-3 (cutaway) suit is not presently stocked for general issue, delivery takes 6 to 9 months from re-

ceipt of requests. Expect procurement of Z-3 at 50% of demand during fiscal 58.

**MK II Life Vests**—A large quantity of defective vests from one contractor has contributed to the critical supply of this item. Interim spec changes were also a factor. Over 30,000 were delivered in the past year, current rate on all contracts is about 3000 per month.

**Anti-exposure Suits**—There were deliveries of defective material here also, plus a lack of planning information upon which to base requirements. Over 12,000 suits were shipped last year on one contract. In spite of the fact that over 20,000 liner jackets and trousers were shipped on other contracts, reports of shortages continue. It is believed that existing stocks of one-piece liners and the superseded jackets & trousers are not being used, there are substantial quantities of them available.

**Flight Deck Helmets**—Over 12,000 were shipped on one contract, the one in the mill now calls for basic helmets, earcup & headband assemblies, and complete helmets. Replacements should be made with components, when available, rather than with complete helmets. You men who wear 'em, compensate for your reduced hearing by *seeing* everything that goes on around you —you could hear from *all* directions, but you can't see everything unless you use that swivel that's built between your chin and your shoulders.

**Parachutes** — QFAC chutes were discontinued in 1954, replaced by the NB-3 (QFB). However, numerous requests from field activities for QFAC chutes have resulted in new procurement, and some 7000 have been delivered. NB-5 (26-foot back-type integrated chute with high-speed pack, for the A4D): delivery is under way on two contracts.

NB-6 is a non-integrated version of the NB-5. About 11,000 are under procurement with a replenishment contract expected this fiscal year. Over 9000 regular and 250 oversize had been shipped as of 19 July.

NB-7 is an integrated back type chute with a 28' canopy, for the F8U, a contract has been let for these, and also for the NB-7A which is a modified NB-7 intended for earlier model F8Us.

NB-8, a 28' non-integrated high-speed back chute is also under procurement for use in highspeed aircraft which do not require the integrated system.

**Auto Parachute Openers**—Initial deliveries sent to NPU, El Centro for inspection contained defects, required correction before release to the field. Commencing in FY 1958 ASO will assume support responsibility for these devices, spare parts procurement is planned.

**Summer Flight Suits**—This item was transferred to the Clothing & Textile Office in April. The several contracts shipping, or about to ship, total over 100,000 suits.

**Torso Harness**—This component of the integrated harness system was developed for the A4D and the F8U. Twelve sizes have been procured, small, medium, large, and extra large, each in short, regular and long. Each pilot is individually fitted. One size larger is needed when you swap your summer flight suit for a poopy suit (read ACSEB 2-57 on this). Originally a life preserver was to be attached to the suit, however current design calls for a separate preserver, the Mk-IIIC. About 2000 torso suits have been delivered, and about 1200 Mk-IIIC. The new life jacket uses a 28-gram $CO_2$ cylinder. Delivery on 10,000 cylinders is expected soon.

**High Visibility Flight Suit**—The Bureau of Aeronautics is developing a high visibility flight suit for wear by pilots flying over the Continental United States, and friendly territories and waters.

High-visibility suits are being procured for service evaluation by both Naval Air Test Center, Patuxent River and by the Naval Air Training Command, Pensacola.

A program has been initiated to determine a suitable dye in the International Orange range which will have a permanent color-fastness and which will be compatible with fire-retardent treatments currently being applied to the permeable, steep twill cotton cloth used in the manufacture of summer flight clothing.

Subject to satisfactory evaluation, high visibility summer flight suits will be specified for supply system procurement commencing fiscal year 1958.

WE'VE received a number of comments and suggestions about the design, color, shape, quality, comfort and durability of certain pieces of personal equipment. Many were good, legitimate ones, and multiple enough to warrant serious consideration of corrective action. These have been forwarded to the cognizant authority along with NASC comment.

We've also received complaints which were quite individual in nature—*and quite often we receive two gripes that cancel each other out.* For example, one person might suggest that some strap be two or three inches *longer*, because he *likes* it that way, while another will ask if it couldn't be made *shorter*, and will also give a valid reason why *he* prefers it that way. We forward those gripes on too, but with little hope.

Personal equipment, like any other equipment, is intended and designed to fulfill certain safety needs and requirements, but it must stop short of personal desires unless they can be more universally justified.

EACH COPY OF APPROACH IS MEANT FOR
12
READERS
PASS IT ALONG!

# WE GOTTA GO, MAN!


*Capt E. V. Friar, aircraft maintenance officer of VMAT-20 tells how his outfit made 'em* **GO,** *and* **COMEBACK,** *for 2 years while logging 24,000 hours without an airborne engine failure.*

**A GREAT DEAL** of anxiety and many questions exist concerning the alarming number of aircraft accidents, loss of life, and destruction of property caused by airborne failure of R-3350 aircraft engines. Judging from the continuing flow of reports concerning this particular type of failure there is indeed cause for anxiety and concern.

Our squadron recently ended a two-year period accumulating approximately 24,000 flight hours operating AD aircraft. During this period there were *no airborne engine failures.*

This accomplishment was the result of an intensive training program for pilots and maintenance personnel with complete cooperation between all departments. The program provided for personal supervision by well qualified Officers and NCO's.

To assume that sound and proper maintenance procedures are more important in eliminating engine failure than sound operating procedures, or vice versa, is similar to the chicken versus the egg proposition; one without the other has little opportunity for success. The combination of conscientious timely maintenance and disciplined intelligent operating procedures is more important in preserving life and property with the R-3350 engine than with other reciprocating aircraft engines. It is not my intention to condemn or criticize this engine. However, it is a particular breed of cat all its own. Using the power settings, manifold pressure, RPM combinations, and methods of operation that were SOP for the older, lower compression ratios, and more weight per horsepower engines, will destroy the R-3350. On the other hand, when given the necessary loving care by the plane captain and maintenance section, and if understood and operated within its capability by the pilot, it is a dependable, responsive power

package.

A section of this unit's SOP for operating aircraft is devoted to engine operation. It is begun with a specific starting procedure and goes through taxi, pre-takeoff, flight, landing, and ends with shut down procedure. The following SOP is required of both pilots and maintenance personnel.

Each pilot joining the squadron is furnished his copy, and in addition, attends a thorough engineering ground school and completes an engineering review and examination. The pilot is given a blind-fold cockpit check, an engine starting, warmup and a taxi check prior to being scheduled for his first fam hop.

The plane captains receive their assignment via the personally supervised check crew route on a competitive and selective basis. The most promising junior NCO's are selected for a plane captain school after completing the check crew apprenticeship. The school includes specific instructions on operation and maintenance of the engine as well as the components and systems of the aircraft. Completion of the school requires a written, essay-type, closed book examination and a performance demonstration on the flight line.

After satisfactory completion of the examinations, they are certified as qualified plane captains in their service record books in accordance with existing instructions. Only personnel meeting the above qualifications are assigned to prepare an aircraft for flight.

All of the foregoing, however important, is not the specific nuts and bolts of R-3350 engine operation and maintenance.

Good engine starting procedures are outlined in applicable pilot's handbooks for aircraft with the R-3350 installed. The procedures are sound and should be followed. The engine start in this

squadron begins with a control position and switches position check. Throttle at 1,000 RPM position, manual mixture control in idle cut off, electrical power on and then engage the starter. The propeller is turned through 16 blades with the starter (this equals approximately 4 engine revolutions) prior to turning the ignition switch to on, or priming. Turning the propeller 16 blades is sufficient to insure a clean clear engine and is not prolonged to the point of excessive engine motoring, overheating, or abusing the starter. After 16 prop blades, turn the ignition switch on and prime while the engine continues to turn. Hold continuous prime until the engine starts.

**AFTER THE ENGINE** initially starts, continue to hold the starter switch on and prime as necessary to get the engine running smoothly. Then slowly and smoothly advance the manual control to RICH while releasing the primer and starter switches. The reason for holding the starter switch on until a successful start is insured is because electrical power for starting ignition is wired through the starter switch. Prematurely releasing the starter switch usually causes an incomplete start with a flooded engine resulting simply because the fuel-air mixture is being pumped into the cylinders with no source of ignition to keep it burning.

*Several hundred engine RPM's are required before the magneto is generating sufficiently to support ignition.* Priming should begin after or simultaneously with the ignition while the engine is turning. Pre-priming or priming while the engine is not turning is one of the chief sources of liquid fuel in sufficient quantity to cause a liquid or hydraulic lock that, incidentally, could result in engine failure sooner or later.

The other source of liquid fuel in sufficient quantity to create a liquid lock during a starting cycle is from the practice of manual mixture control priming and starting. The primer system on the R-3350 engine is capable of delivering enough fuel to the blower section of the engine, when mixed with the proper proportion of air, to maintain a power setting of approximately 24 inches of manifold pressure. With that in mind, it becomes readily apparent that if one of the lower intake valves is open or the supercharger drain valve sticking, and the primer solenoid open with the engine at rest, the excess fuel would flow into the open cylinder or remain in the bottom of the blower case. This will result in a liquid lock when the engine starts turning. The same thing occurs under similar conditions when the manual mixture control is opened with fuel pressure up.

The fire hazard created by use of pre-priming and/or manual mixture control starting is another serious consideration. Both of these methods of

Conscientious and timely maintenance and . . .

# WE GOTTA GO, MAN!

Continued


. . . disciplined, intelligent operating procedures . . .

. . . are more important with the R-3350 than with any other reciprocating engine.

engine starting are condemned by the Bureau of Aeronautics. Paragraph 4f page 18 of T. N. No. 38-52 contains specific instructions relative to this subject. If an engine fails to start in this unit by use of normal starting methods the aircraft is grounded until necessary repairs are effected. It is considered much more economical to miss a hop and change a primer solenoid, switch or battery than it is to retrieve a wrecked aircraft. Rumor has it that there are still several individuals and at least one operating squadron with a manual mixing control starting SOP. I wonder how many Naval Aviators have been killed because of a previously hydraulicked engine?

**FOR WARM UP** and/or taxi, neither the pilot's handbook nor the engine maintenance manual for the AD(R-3350) engine provide specific minimum operating temperatures. Minimum operating temperatures are considered very important in this command. Some internal combustion engine experts calculate that from 75% to 85% of all engine wear occurs during the first five minutes of operation after start. The wear is from friction caused by lack of lubrication and low operating temperatures. When the engine is stopped the oil drains from the cylinder walls, bushings, and bearing surfaces to the bottom engine sections. When the engine is started, a certain time element and temperature are required to provide adequate lubrication at critical points throughout the engine.

Our procedures require a minimum of 35° C oil temperature and 100° C cylinder head temperature at a maximum of 1000 rpm in the chocks prior to taxi. This allows the oil pressure to stabilize and the engine to warm up to minimum operating temperatures evenly and smoothly. This also insures adequate lubrication before applying operating loads. In warm weather minimums are reached soon after the oil pressure stabilizes. In cold weather it requires about two minutes.

No minimum temperatures are required in applicable instructions for engine check out or for takeoff. Again, in the command, minimums are considered extremely important. The propeller check is started at 1550 rpm with a minimum of 40° oil temperature and 125° cylinder head temperature. By the time the propeller check is completed, the CHT is usually a minimum of 150° and the oil temprature well within a reasonable operating range. For takeoff a minimum of 160° CHT is required. The temperature required for acceptable spark plug performance is of primary concern. With the advent of high compression, high power output aircraft engines, spark plugs are designed with a rapid heat transfer rating and begin to operate at maximum efficiency at 175°. When they are hot they are not nearly so succeptable to fouling.

Idle mixture, operating mixture and use of the manual mixture control have a direct bearing on success or failure with the R-3350 engine. This is the trouble spot that this writer believes is responsible for 75% of all aborted takeoffs due to popping and rough running engines, at least 80% of premature spark plug removals and at least 50% of the unexplained, "It just up and quit," airborne engine failures. Many of these engines are recovered, given a ground run and reported, "Ground checks O. K." and branded, "Cause Unknown." For the maintenance section—it requires far less effort to read pertinent maintenance instructions and conscientiously regulate the carburetor idle mixture than it does to continuously and prematurely change spark plugs; or to investigate malfunctioning or failed engines caused by excessively rich or lean carburetor idle mixtures.

**THIS UNIT REQUIRES** an idle mixture check each time a pilot mans an aircraft. If the mixture is not within reasonable limits it is recorded on the part "B" of the yellow sheet, grounding the aircraft for adjustment. It is an established fact that an engine can be idled and an aircraft taxied indefinitely with the manual mixture control in the FULL RICH position with no damage to the engine or spark plugs if the idle mixture is adjusted within prescribed limits. Damage is not only possible but prevalent with the practice of idling and taxiing with the mixture control *out* of the FULL RICH position. FULL RICH is the healthy position for the mixture control. *Use* FULL RICH for ground operation even though the mixture is richer than limits. The properties that collect on and foul spark plugs from a rich mixture are combustible and will dissipate simply by employing spark plug clean-out procedure.

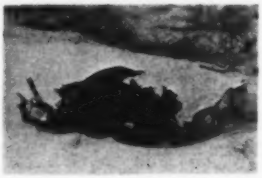
The really dangerous situation is the practice of operating the engine on the ground with an idle mixture set too lean or manually leaned for prolonged periods. The properties that collect on and foul plugs from low power, low temperature and excessively lean conditions are not combustible and no method of eliminating the contamination is available to the pilot. Too often this type of fouling is not detected during the ground preflight and magneto check. The breakdown occurs during the latter stages of the takeoff run at full power when pressures, temperatures and loads are extreme. Pilot action and maintenance responsibilities concerning this subject are amplified on pages 23 through 25 of GREB No. 137.

Unit SOP requires a specific method of engine operation check prior to takeoff. During the switches and controls position check on entering the cockpit the position of the indicator on the manifold pressure gage is noted prior to engine start. This provides a field barometric pressure

# WE GOTTA GO, MAN!

Continued

"I wonder how many Naval Aviators have been killed . . .



standard for magneto and power check. After the preliminary checks the throttle is advanced until the manifold pressure gage indicator reaches the "before start" position. The engine is then operating at field barometric pressure. RPM of the engine is then checked for 2300 rpm + or —50.

Each type internal combustion engine prop combination has an RPM "index" when operated at field barometric pressure with the aircraft static and the prop in full low pitch. This constant may be used as a power output indicator to determine many engine discrepancies that are not otherwise indicated. The constant for this engine with Aeroproducts G-805 prop is 2300 rpm + or —50.

A completely dead cylinder can't be detected by a magneto check when using a standard RPM or manifold pressure setting as an index. It can be detected immediately by setting the manifold pressure at field barometric pressure and using the resulting RPM as an index. One dead cylinder causes approximately 100 rpm loss of power.

An impeller stuck in high blower is indicated by a loss of approximately 150 rpm. Of course a stuck blower is readily detected by a blower check, but blower checks are not performed daily.

Alternate air door positions may be detected. In warm weather an alternate air door stuck in the alternate position causes a loss of from 100 to 150 rpm on a barometric pressure power check.

A twisted tail shaft can be detected by a power loss indication.

There are a multitude of other deficiencies and malfunctions that develop on engines from time to time that can be detected by the use of a field barometric pressure power check. The habit of using 30" as a standard manifold pressure for a magneto check on any engine is poor operating procedure. At sea level 30 inches is approximately field barometric and will produce the desired RPM.

However, to attempt to check the mags at 30" at Denver would produce RPM sufficient to nose an AD over and result in an accident. On the other hand, an SOP of field barometric pressure mag check would produce the same RPM under similar mechanical conditions regardless of field elevation or geographical location. Any engine in this unit that does not check within the RPM limit range is grounded, the reason determined, and repaired prior to further flight.

**ALL TAKEOFFS** are made with full power for several reasons. The first is pilot safety. Application of full power in the early stages of the takeoff run develops flying speed early and reduces takeoff roll. Usually there is enough runway left to abort or land straight ahead in the event the engine does malfunction. Other factors that lend support to a full power takeoff are: High airspeeds are attained sooner for better cooling. High power reduced sooner—piston ring miles are less.

The R-3350 engine has definite structural MEP limits. These limits are more critical than those of the older lower power/weight ratio engines. When the limits are exceeded the result is engine failure in the form of blown cylinder heads, bent articulating rods, collapsed piston heads, and failed bearing surfaces, to mention a few. The AD Pilot's Handbook contains operating power charts that illustrate the maximum allowable manifold pressure-RPM-power combinations for various altitudes. I would like to emphasize that these charts *border the maximum*. To continually operate demanding the maximum from man or machine establishes progressive fatigue that eventually results in failure, or at the very best, reduced life.

. . . by a previously hydraulicked engine?"

It's more economical to miss a hop and change a primer solenoid, switch or battery than it is to retrieve a wrecked aircraft.

**PROPER ENGINE** shut-down procedures are considered as important as proper starting, operating and maintenance procedures. This unit established a shutdown procedure that requires a minimum of two minutes in the chocks at 800 rpm, mixture control best power prior to engine cut after each flight or high power ground run.

During flight or high power ground run a considerable amount of oil is being splashed about the engine that is not being returned to the oil reservoir. The two minute idle time provides a time element sufficient to allow the splash oil to drain to the sumps and be returned to the oil reservoir. This reduces the possibility of liquid lock from oil seepage. It provides time for the low power spark plug burn out procedure that insures a clean ignition system for the next start and time to permit the engine to cool slowly prior to shutdown. All three factors are essential to engine longevity and satisfactory operations. Immediately prior to shutdown the throttle is positioned to give 1000 rpm and the mixture control moved directly to IDLE CUTOFF. This positions the manifold pressure regulator at the optimum for the next start.

**PILOTS ARE REQUIRED** to record all noted discrepancies on the part "B" of the yellow sheet regardless of how minor in nature. Complete honesty by the pilots in reporting discrepancies and the reliance of these pilots on proven operating procedures is most important.

The maintenance procedure is to investigate, correct, and sign off all noted deficiencies prior to making the aircraft available for the next flight. The terms, "*Ground checks O.K.*" or "*Will pick up on next check,*" where engine and aircraft discrepancies are concerned, are considered profane and are not tolerated in this unit.

One of the greatest aids in trouble shooting, reducing maintenance time, improving mechanical conditions and reducing maintenance cost is the constant use of a portable aircraft engine analyzer. in the squadron. Installation of a synchronizer generator and provisions for quick-disconnect type hookup (ASC 443) on each engine eliminate approximately 75% of the time element involved in analyzer use and considerably encourages its use.

The above is not a complete discussion of all the elements involving R-3350 engine operation and maintenance. However, we do feel that employment of the above methods and procedures, in addition to others, has been invaluable in pilot confidence and safety, improved mechanical conditions and increased utilization of aircraft.

It's been said of this squadron's procedures "that may be O.K. for a training squadron, but we in the Fleet can't be bothered, WE GOTTA GO, man!"—noteworthy is the observation that *units with the highest combat-readiness ratings also have the best safety records!*

Op Nav report 3750-10

# FLIGA

**forced landings, incidents, ground accidents**

## 13 The Occurrence or Maneuver

## 14 Causes and Corrective Action Taken

(13). The pilot, students and crew boarded the aircraft at the buoy outside the breakwater for an instrument training flight (H-4 and H-7). Normal preparations for flight were made. While executing the pre-takeoff check-off list, the Japanese student reported uneven swing of the port rudder during visual control check. Due to language difficulties, the instructor discounted the report inasmuch as what he understood to be a "3-degree" rudder throw differential would not be detectable from the cockpit. The controls operated free and easy. Following an ITO at 1254 a slight flutter movement was noted on the rudder pedals. Both the student and instructor assumed this to be the result of poor trimming. The aircraft landed and remained on the water for 40 minutes awaiting improvement in local weather over the seadrome. When the training period was resumed, increasing flutter was noted in the rudder pedals, and considerably more than normal rudder pressure was required for control. The aircraft was landed at 1530 without difficulty, but normal flight required constant use of rudder trim tab. Detailed

inspection revealed that the rudder cable P/N 162D6030 was broken and frayed 23¼ inches from the rudder quadrant attachment end.

⑭. Material failure induced by faulty maintenance. The port rudder cable was severely weakened by rust and corrosion for a distance of 30 inches from the rudder quadrant attachment end and 18 inches from the inboard end.

PBM Check Sheets have been changed to require removal, inspection and preservation (or replacement where required) of *both* rudder control cables located in the horizontal tail section at both the 240 and 480 hour intervals.

Closer inspection procedures have been initiated.

⑬. A P2V-5F was being used for student landing practice with a qualified PPC in the right seat. During what was described as a normal landing the starboard main gear tire blew out. The directional control of the aircraft was maintained with the use of reverse thrust and brakes, however the wheelwell area was damaged by the re-capped tire casing.

⑭. Examination of the failed tire casing, crosswind conditions plus assymetrical reverse thrust indicates excessive use of brake to provide directional control. Pilots have been cautioned against using high assymetrical reverse thrust as a training function.

*Routine inspection of tire prior to flight revealed no material discrepancy. Although the failed tire was subjected to abuse during the landing it should be noted that some recapped tires provide a flying missile hazard greatly in excess of what is normally expected from a new tire.*

⑬. An FJ-3 was being moved aft into a very close spot when the starboard elevator was allowed to strike a boat gripe, cutting the elevator and requiring replacement. The director stated that: "The clearance was close in several places and while watching one close spot the plane struck in another."

⑭. The high number of hangar deck crashes indicates that a loose spot vice a close spot should be used on the hangar deck. Recommend that all directors and crews be instructed that a close spot is dangerous to aircraft.

SECOND ENDORSEMENT:

*Hangar deck directors are now required to bring the aircraft to a full stop about 3 feet before arriving in a final spot, then proceed slowly into the spot. When parking in close spaces, the hangar bay supervisor will act as a safety observer, stationing himself where he can observe clearances not easily seen by either of the other two directors.*

*Directors will continue to be impressed with their responsibility in the avoidance of damage to aircraft and the fallacy of unnecessarily close spotting.*

⑬. During an AJ-1 post-check, all division turnup, the left main alighting gear collapsed. The left wing of the aircraft settled immediately to the ramp causing aft lower fuselage crush damage from station 424.6 to station 538 at canted bulkhead. Sealed bulkhead at station 489 torn and crushed up to the fore and aft lower longeron. The left prop blades were sheared off at 24" from hub. Left engine sudden stoppage. Slight damage occurred to: left bomb bay door, jet access door, left tip tank, left wheelwell doors, fairing at wing root of left wing.

⑭. An investigation disclosed that this accident was caused by (1) landing gear safety pin, on which the spring locking mechanism was broken off, and (2) the inadvertent operation of the landing gear Weston valve.

The landing gear pin was observed to be installed prior to turnup. However, the subsequent prop wash, in the wheelwell, acting on the warning ribbon dislodged the pin. The Weston valve was *inadvertently* operated by the maintenance personnel while investigating inoperative flaps. The physical location of the Weston valves is a confined area and the proximity of the landing gear valve to the flap valve is well within the span of the normal hand. The electrician did not visually observe the position of his hand on the Weston valve panel during the valve operation.

A post-accident dropcheck revealed no electrical or mechanical malufunction of the landing gear system. The manual operation of the landing gear up side of the Weston valve by-passes all electrical circuitry, and allows hydraulic pressure (at 300 lbs) to move the down-locking mechanism and the main actuating cylinder to the gear UP position. The absence of the ground safety pin allowed the gear to fold. The ground safety pin was found approximately 100 feet aft of the left wheelwell on the ground. The pin was examined and it was revealed that the spring lock had been broken for some time as evidenced by the deposits of grime and rust in the spring lock area.

Positive inspection of the ground safety lock pins for proper type and installation was recommended.

Continued next page

# FLIGAS

Continued

⑬. AD-7 was second plane in a simulated section dive bombing run on CVA during a 2 G exercise. Radar bomb and wing rack were torn from aircraft when plane inadvertently entered slipstream of lead aircraft at high speed near the bottom of the dive.

**⑭. Instruct pilots to remain well clear of probable slipstream areas of aircraft ahead when at high speeds carrying radar bombs.**

⑬. HEAVYWEIGHT—The F9F-6D aircraft starboard gear began to sink in macadam while the chief-in-charge placed six men around the starboard wing to assist the tractor in pulling aircraft on to metal plates. The aircraft had sunk about 8 inches by this time. As the tractor driver eased forward the nose-gear tore loose from the bulkhead causing considerable structural damage.

**⑭. Spotting of aircraft on macadam not designed for jet aircraft parking. Ground handling crews have been instructed not to attempt to move aircraft that have sunk into macadam without placing metal plates under the wheels. Also that no jet aircraft will be parked on macadam without metal plates to place under the wheels as soon as the aircraft is stopped.**

⑬. FJ-3M engine flamed out when the throttle was moved from 100% to idle detent in the air, and again on the deck after a landing had been made. The flameout was caused by slippage of the throttle quadrant idle stop slightly rearward, causing too low an idle setting. All aircraft are being checked for security of the idle stop.

**⑭. The slippage of the throttle quadrant idle stop to the rear was caused by the two screws that hold the idle stop in position working loose. This looseness was not apparent on ground turn-up prior to the flight.**

⑬. The landing gear of a P2V-2 retracted with nosewheel entrance ladder in the down position warping the nosewheel door. Ladder warning light observed to be OUT on the takeoff roll.

**⑭. All pilots will be thoroughly indoctrinated in the standard procedures to use when confronted with an emergency of this nature. Also pilots will be cautioned that in the future when an emergency of this type occurs that the ladder up indicator light in the cockpit is not always positive indication that the ladder is up and locked. The bulb could be buned out. A visual check of the ladders is mandatory before any action is taken to raise gear.**

⑬. The F9F-2 was parked. The P2V-5F was being towed to its parking spot. The P2V proceeded past the F9F, but could go no further because of the location of other aircraft. The P2V was backed out of this location. The starboard wing tank of the P2V struck the vertical stabilizer and rudder of the F9F.

**⑭. Too few persons involved in moving the P2V, affording inadequate wingtip surveillance while towing in close quarters.**

⑬. A TF-1 was being pushed tail-first from the hangar deck to No. 3 elevator at a slight angle. The pilots were in the cockpit. A tow bar was being used to steer the aircraft. Upon approaching the elevator the following incidents occurred in rapid order. The ship rolled to starboard, simultaneously the aircraft accelerated, the force of the wind striking the empenage caused the aircraft to pivot on the port wheel swinging the tail aft until it struck the elevator cable.

**⑭. Aircraft was being pushed too fast for the existing conditions. The strong wind across the deck, wet elevator and the time lag in the pilot's response to apply the brakes were contributing factors.**

***All pilots and crew members have been advised to exercise extreme caution when moving the TF aircraft because of the tendency to weathercock due to lack of weight on the nosewheel.***

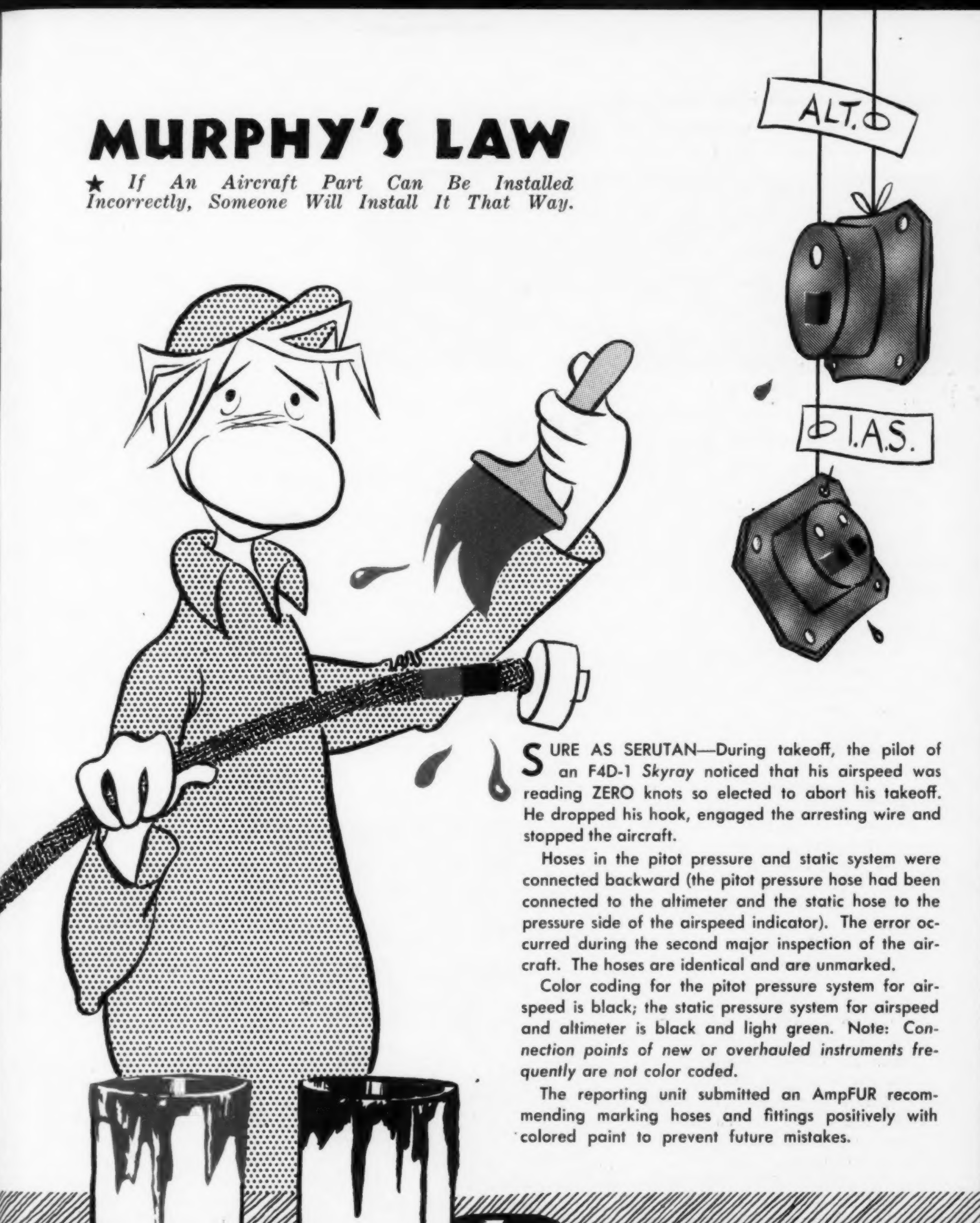
⑬. The F9F-8 aircraft had just been respotted, tail outboard, on the port side of the flight deck (frame 155) with two tie-down cables, one on the starboard gear and another on the nose gear which was being tightened at the time. A chock was believed to have been on the starboard wheel. There was no tie-down cable on the port wheel. The position and tightness of the port wheel chock remains in doubt. The aircraft rocked forward and aft with the ship's roll (2°-2½°), breaking both the tie-down cables, moving free of the chocks, and rolling aft to the port side of the ship. The plane captain, who was still in the cockpit, made two unsuccessful attempts to stop the aircraft with foot brakes. He jumped to safety on the flight deck just before the aircraft fell through the lifeline railing on the catwalk and into the sea.

**⑭. Lack of a port tie-down cable and a loose or misplaced port wheel chock allowed the aircraft to rock with the ship's roll. Only two tie-downs were on the aircraft, one of which was being tightened at the time. The flight deck was damp. This operation was being conducted in the darkness without moonlight and very little illumination. The plane captain could not stop the motion of the aircraft with brakes before he abandoned it.**

**All line personnel and plane captains have been instructed to exercise extreme caution during spotting operations at night.**

# MURPHY'S LAW

★ *If An Aircraft Part Can Be Installed Incorrectly, Someone Will Install It That Way.*



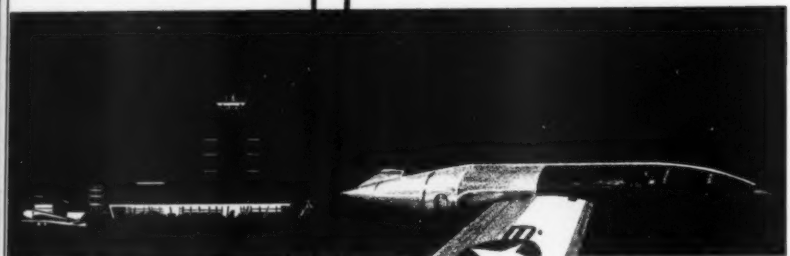

**S**URE AS SERUTAN—During takeoff, the pilot of an F4D-1 *Skyray* noticed that his airspeed was reading ZERO knots so elected to abort his takeoff. He dropped his hook, engaged the arresting wire and stopped the aircraft.

Hoses in the pitot pressure and static system were connected backward (the pitot pressure hose had been connected to the altimeter and the static hose to the pressure side of the airspeed indicator). The error occurred during the second major inspection of the aircraft. The hoses are identical and are unmarked.

Color coding for the pitot pressure system for airspeed is black; the static pressure system for airspeed and altimeter is black and light green. Note: *Connection points of new or overhauled instruments frequently are not color coded.*

The reporting unit submitted an AmpFUR recommending marking hoses and fittings positively with colored paint to prevent future mistakes.

# TIP TANK



**Miscellaneous aviation safety information**

**FOUR C's**

During a visit down Norfolk way, a Flight Service officer picked up a bit of sound advice which we think is worth repeating. Although second hand, we understand that this bit emanated from a Coast Guard type throttle bender of numerous hours above ground. Let's call it the "Four C's for a LOST AIRCRAFT." If you dislike the word *lost*, then call it something else. The point remains that the lad's position is somewhat of a question. The procedure is something like this:

a. Confess
b. Climb
c. Communicate
d. Comply

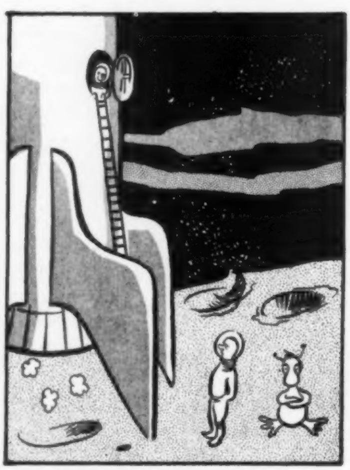
It's no disgrace to admit that you are lost. It is better to go ahead and CONFESS early so you can get help while there is time.

CLIMB so that someone will be able to hear you also remembering that altitude above you is of no use in an emergency.

COMMUNICATE with some facility and let your trouble be known. Everyone who hears you will be willing to help.

COMPLY with instructions from authorized facilities; they are trained to help you.

Not bad eh! And remember to check your Radio Facility Chart for instructions on use of the D/F net through military Flight Service.—*Flight Service Bulletin.*



*. . . he says the snack bar is closed*

**FOOD FOR THOUGHT**

We are again entering the winter season with occasional icy runways and braking action "POOR TO NIL". In the past we have usually kept on flying under these conditions because "the other fellows were doing it" . . . until someone else took the responsibility of stopping the operation. HOW MUCH of the responsibility for safe operation on icy runways are YOU taking?

**HIGH**

A recent AAR, which involved ejection at high altitude from an A4D, contained a recommendation that *Approach* discuss the physiological and aerodynamic problems associated with high altitude, high speed ejection. As more material on the subject becomes available it will be published; for the present, readers are referred to "High Altitude Ejection" in the February 1956 issue of *Approach*.

**CARBON DIOXIDE**

Carbon dioxide can be extremely dangerous as demonstrated by an incident at McGuire AFB where 6,000 pre-cooked dinners, packed in 12,000 pounds of dry ice, emitted $CO_2$ in such quantities as to cause sickness to the crew and to cancel a flight.

As the result of this and previous incidents attributed to $CO_2$ poisoning, headquarters has restricted the use of dry ice aboard pressurized planes to the amount actually needed to refrigerate the meals required by the flight and on unpressurized planes, to the amount of dry ice required for the preservation of vaccine, antibiotics, whole blood, etc., in shipments up to 500 pounds.

In the meantime, studies are being conducted to determine the safe load limits of dry ice permissible aboard both types aircraft.—*MATS Flyer.*

# OLD PRO CLUB

### LTJG J. R. PETERSON

**Aircraft: AD-6, VA-96**

During mirror FCLP, the right wheel of the AD-6 cocked about 70 degrees. LTJG PETERSON elected to land by placing his right gear on a foam strip laid out on the runway. He touched down on the port gear and tailwheel, keeping the right wheel off the deck as long as possible by judicious use of ailerons and rudder. As the plane slowed, the cocked wheel settled onto the foam strip and the aircraft continued straight down the runway, swerving only slightly.

### LTJG A. J. SERENO

**Aircraft: T-28, Whiting Field**

A student pilot was unable to lower his landing gear on returning to the field. LTJG SERENO joined in formation on the student and diagnosed the situation. A pressure lock in the system made it impossible for the student to move the landing gear control handle. LTJG SERENO instructed him to lower the speed brakes, depressurizing the landing gear hydraulic system, and then simultaneously to move the landing gear control. His thorough knowledge of the T-28 systems prevented wheels-up landing.

### Aviation Cadet TERRANCE P. O'MAHONEY

**Aircraft: SNJ, NAAS Barin Field**

Taking off after his final carqual landing aboard the USS *SAIPAN*, Cadet O'Mahoney experienced a rough running engine which emergency procedures failed to correct. To prevent a possible ditching en route to Barin Field, he was ordered to land aboard the *SAIPAN*. However, following his last landing, the SNJ's tailhook had been wired up. Cadet O'Mahoney was informed he would have to make a no-hook landing and was instructed in the technique by the LSO. He landed three-point between the No. 2 and No. 3 wire, held back on the stick and braked to a stop without damage.

**Recognition of heads-up flying is essential to a positive program of flight safety. Each month, Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership. Old Pro's also receive a wallet membership card as a memento of the occasion. Commanding officers are invited to submit nominations for selection.**

# aircontrolman

THE aircontrolman is generally known as the man with the microphone, directing air traffic from his elevated post in the tower. In some respects however, the work of the aircontrolman can be compared to an iceberg—the bulk of it is below the surface and not obvious to the casual eye.

He must, for example, have an aviator's appreciation of weather; know the local radio navigation aids as thoroughly as a pilot; be able to assist disoriented pilots by direction finding equipment and from an accurate knowledge of local terrain. Above all, the aircontrolman must have an ear for his work, the jumbled sound from numerous loudspeakers in a -busy tower is unintelligible to an untrained ear.

Another, and equally important, section of the aircontrolman rate is the functions of ground controlled approach and carrier controlled approach. Upon these GCA and CCA scope readers rests much of naval aviation's "all-weather" flying capability. GCA has come a long way since 1947, when there were only 33 Navy units operating around the world. Even with lowered weather minimums, increased traffic and more critical requirements for handling jets, the "talk-down" landing system has kept a reputation for efficiency and safety.